DECEMBER 22, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

China Makes Fantastic Gains, Starts Big Industrialization

• Sleeping China begins to awaken. Backyard blast furnaces like this will eventually be replaced by modern units, but even with primitive facilities, China is increasing production rapidly. Its steel output reached 5.4 million tons in 1957, will probably hit 10.7 million tons this year. More expansion is underway. In the long run, China may become the most powerful of all Communist nations. STEEL summarizes the prospects for all Iron Curtain countries beginning on ....Page 32

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Labor Prospects Ominous as Steel Girds for 1959

Page 31 . . .

How To Cut Indirect Labor Costs

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Two Shortcuts to Complex Parts

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Tape Control Speeds Riveting

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Plasma Arc Melts at 30,000°F

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Steel 'Extras' Stable Next Half

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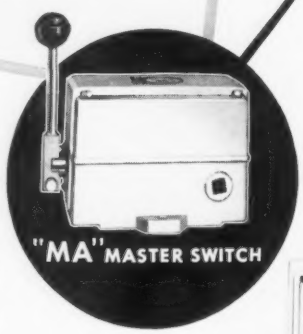
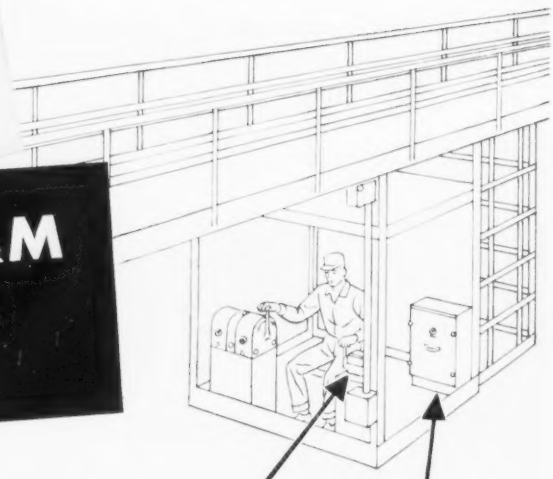
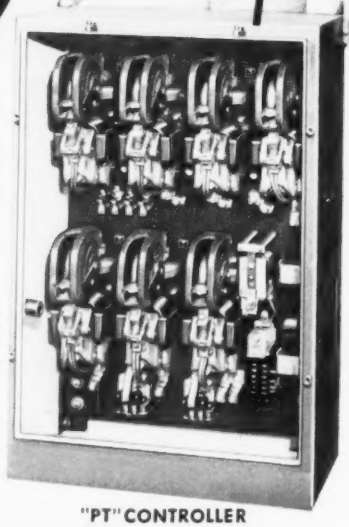
Better than Manual Control for So Many Reasons!

NEW LOW COST EC&M MAGNETIC CONTROL FOR DC CRANES

Now, on any DC application up to 55 HP, 230 volts, you can have the advantage of full *magnetic* control where manual control formerly was specified purely on the basis of price. At comparable cost, EC&M's new *Type PT* Magnetic Control gives you—







"PT" CONTROLLER
with front cover removed

Compactness—fits easily in crane cabs, on crane walkways and wherever space is limited.

3-Point Speed Control in either direction.

Reduced Motor Wear through automatic acceleration. Acceleration relays adjustable from 0.2 second up to 2 minutes per step.

Space Saving—front connection permits mounting against wall.

Maximum Safety—completely enclosed.

Fewer Spares—no manual control parts to stock.

Choice of Mounting Arrangements—MA Master Switch can be ganged with other masters or self-contained on top of the PT Controller.

Standardized Overload Protection is available. Separate panel for protection of 1 to 4 motors is smaller, simpler than protective panels used with manual controllers.

Write FOR BULLETIN 6131

Available for Hoist, Bridge and Trolley motions on cab or floor-operated cranes

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

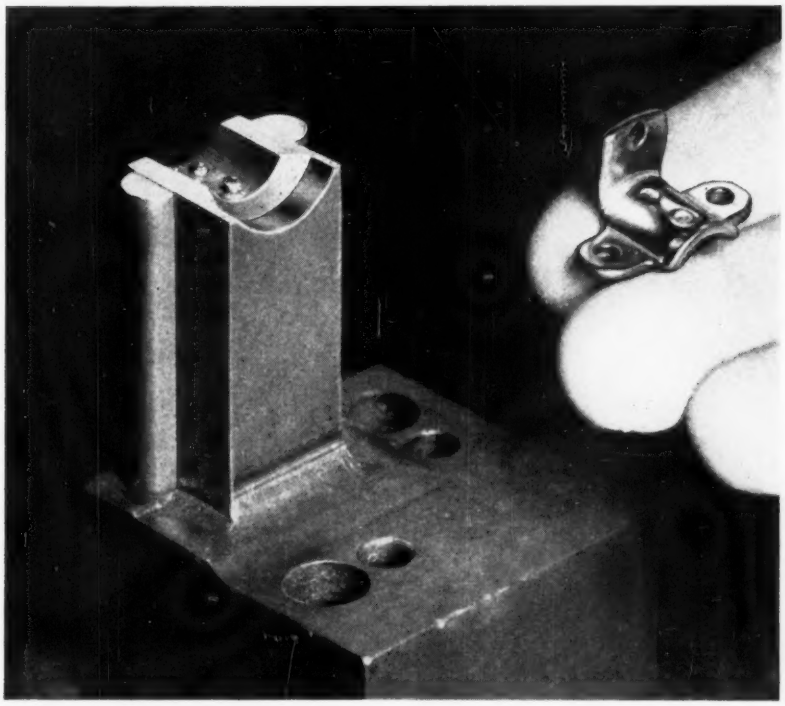
1236

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

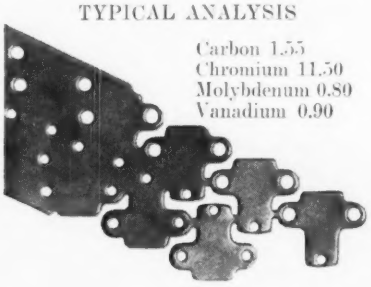


1½ million pieces with Lehigh H ...that's a long run in any league!

At Harvey Hubbell, Inc., Bridgeport, Conn., they were using a competitive grade of tool steel to form cord-clamp sections made from Grade 1010 steel strip. But each time they hit an average figure of 700,000 pieces, the die cracked, and had to be replaced. The manufacturer decided to call in Lindquist Steels Inc., a local distributor of Bethlehem tool steel.

TYPICAL ANALYSIS

Carbon 1.55
Chromium 11.50
Molybdenum 0.80
Vanadium 0.90



"With the finished part only .060 in. thick, we ought to do better than 700,000 pieces. What do you suggest?"

The distributor studied the operation, the cracked die, and the finished part. "I'd recommend Lehigh H," he said. "It has the strength you need in a forming operation of this sort." The Lehigh H was put on the job and produced 1½ million pieces without any trouble.

Lehigh H is our high-carbon, high-chromium, air-hardening tool steel. It's a grade with outstanding wear-resistance and toughness. And it's also a deep-hardening steel with high compressive strength.

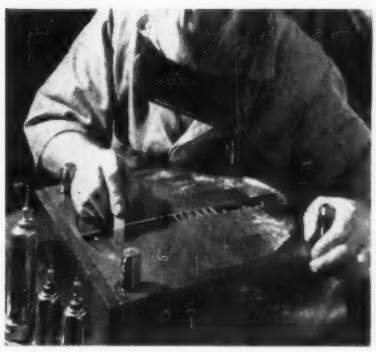
The best way to evaluate Lehigh H is by putting it to work—not in an easy job, but in a tough one. Your Bethlehem tool steel distributor carries Lehigh H in stock, and will see that it's delivered promptly. Get in touch with him.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Don't Use Fresh Water For Quenching Tools

Fresh water, regardless of its source, contains dissolved gases which make it unsuitable for quenching tools. When tools are quenched in fresh water, gas is liberated at the surface of the tool. Gas pockets thus formed may prevent contact between tool and water, resulting in soft spots from ineffective quenching. Soft spots are undesirable because of their low hardness, and also because a quench which produces them may also cause cracking of the tools.

Soft spots, and tool cracking associated with soft spots, can be avoided by quenching in water which has been previously boiled, to remove the dissolved gases. If water cannot be boiled, quench a large amount of hot "dummy" material to expel the gases. As a further precaution against soft spots, it is preferable to use a 10 pct brine solution instead of water. It is also suggested that the dissolved gases be expelled from the brine solution before use.



USE DURAMOLD FOR COLD-HOBBING

Bethlehem's Duramold tool steels, in Grades A and B, are ideal for cold-hobbing plastic dies because they are free from injurious surface and internal defects. Duramold A, an air-hardening grade, is annealed to 109 max Brinell. Duramold B hardens in oil, and hobs more readily than Duramold A. It is annealed to 100 max Brinell, and has an addition of boron to increase the core strength.

creative designing calls for an open mind

Leonardo Da Vinci's design for a pump using the Archimedian screw principle *Model courtesy of IBM*

EVEN DA VINCI'S DESIGN FOR A PUMP COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

An SKF engineer never tends to favor one or two types of bearings in his recommendations. That's because SKF makes all four types of ball and roller bearings in over 3,000 sizes. This gives our engineers the kind of flexibility they need to keep an open mind on any bearings problem. Give your problem to us and see. 7822

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

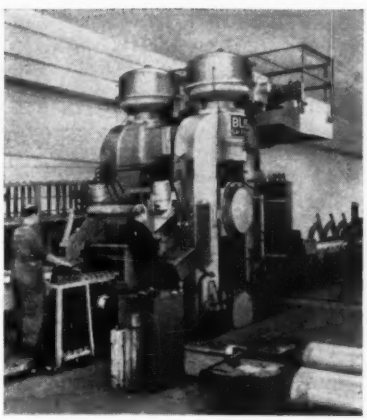
®REG. U. S. PAT. OFF.

Bliss mills roll brass within a Norwegian mountain

Some 120 kilometers north of Oslo, buried deep underground in the side of a mountain, is Raufoss Ammunisjonsfabrikker, Norway's state-owned, privately operated consumer goods and munitions producing company, a prime supplier to the NATO nations and an important cog in the defense of the West.

Helping Raufoss play this major role are two Bliss-built rolling mills—a 30" x 52" two-high hot reversing mill used for rolling aluminum, brass and mild steel up to a meter wide (39.37"), and a 16" and 34" x 34" cold reducing mill for rolling brass up to 30" wide. These mills, helping to turn out the weapons of defense, are also used by Raufoss to produce the strip it uses to stamp out a wide variety of components for industry's everyday needs.

This installation is just one more example of the acceptance of Bliss rolling mill equipment, both in the U. S. and abroad. Learn how Bliss has engineered other installations—ferrous and non-ferrous. Simply write for a copy of our 84-page Rolling Mill Brochure, Catalog 40-B.



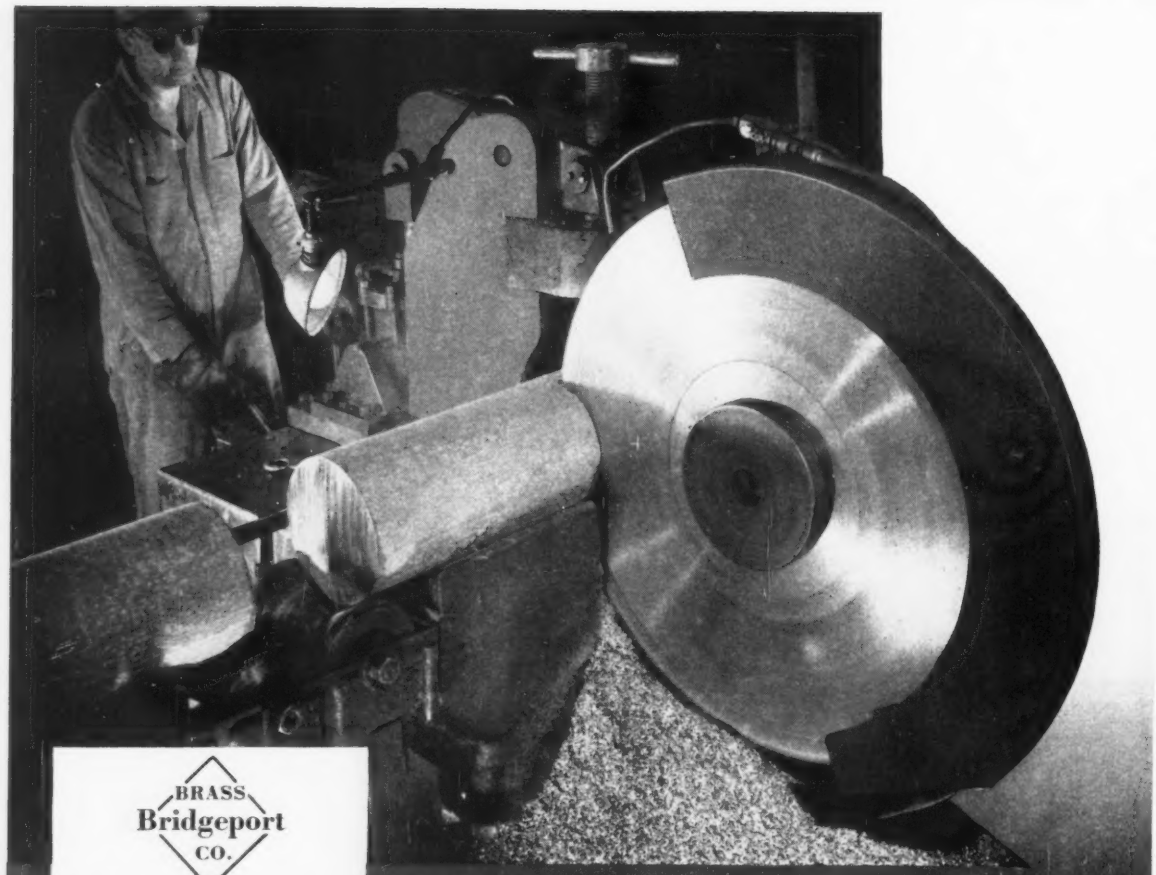
This 16" and 34" x 34" cold combination rundown and finishing mill can roll material up to 30" wide.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



BRASS
Bridgeport
CO.

At Bridgeport Brass plant in Indianapolis a 38″-dia. Atkins Segmental Saw is shown cutting 10″ extrusion billets. These are Bridgeport's famous Duronze III billets made from high strength, corrosion resistant silicon aluminum bronze. Rate of feed is 14 inches per minute. Note smooth burr-free side wall on newly-cut billet.

ATKINS
Curled Chip SEGMENTAL SAWS

rate best in the toughest test of all:

cutting Copper Base Alloy Extrusion Billets

● There's no better way to test a saw's cutting ability than on copper alloy. This hard-to-machine metal clogs conventional tooth gullets and galls the sides of the saw, often stalling the machine.

Atkins' patented "curled chip" tooth design puts an end to these problems. Ordinary saw teeth (Fig. 1) wedge chips into the gullet; Atkins teeth (Fig. 2) *lift* the chips in a continuous curling action. Chips explode from the gullet like suddenly released clock springs, leaving a clean, free-cutting tooth edge.

You can *double your rate of feed* with Atkins "Curled Chip" Segmental Saws. Use them for heavy duty cutting of both ferrous and non-ferrous metals. You'll get more cuts per grind at lower tool cost. And Atkins segments are the economical way to replace worn teeth without discarding the saw plate.

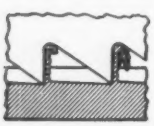


FIGURE 1
Conventional Tooth

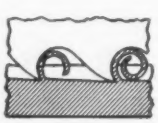


FIGURE 2
Curled Chip Tooth

Write for 16-page Atkins catalog covering circular and band saws for every metal-cutting need.

ATKINS Silver Steel SAWS

ATKINS SAW DIVISION
BORG-WARNER CORP.
Indianapolis 9, Indiana

BW

This Week in STEEL

The Metalworking Weekly

December 22, 1958
Vol. 143 No. 25

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We believe management should think about improving communications with its labor force.

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In the next ten years, Red China may be a bigger threat to the U. S. and world peace than Russia is now. China is nearing its steel production goal rapidly and eventually will overtake Britain as a world industrial power.

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A Democratic split could result in less spending in several areas where business wants more.

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Detroit is hunting for a ghost that is leaving lines on sheet steel used for stamping hoods and roofs.

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Businessmen will get what they want for Christmas: A return of confidence and a higher level of activity.

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Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Rx FOR TIRED MACHINES

PATIENT: Style 215 Precision Boring Machine—built in 1939.

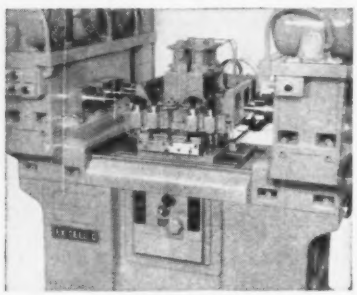
SYMPTOM: Speeds too slow for modern production, tooling outdated.

DIAGNOSIS: Continuous duty from 16 years of heavy work.

CURE: Ex-Cell-O Machine Renewal and Repair Service.

RECOVERY: Fast, complete, guaranteed.

FUTURE: Longer life, "like new" performance.



This 16-year-old Precision Boring Machine, recently rebuilt and retooled by Ex-Cell-O, is back on the job, giving profitable, "like new" service. Renewal or modernization of standard or special machines by Ex-Cell-O experts restores original precision and greatly extends the value of your investment. The service is quick, the workmanship thorough, and your complete satisfaction is guaranteed. Call your local Ex-Cell-O Representative, or write direct for full details.

XLO EX-CELL-O FOR PRECISION
58-52

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

behind the scenes

Postage Hike: Wow!

Fred Allen, the celebrated radio comedian, used to interview a character who made a practice of denying keen emotion. When Fred accused her of exhibiting symptoms of extreme agitation, her standard comeback was, "So who's ex-SIGH-ted? Who's ex-SIGH-ted?"

Evidence on a post card received by STEEL's Beat-the-Experts Contest editor strongly suggests that the entrant was a victim of his own mental turmoil. Back on Nov. 17 when STEEL invited readers to guess the number of automobiles that would be produced in the U. S. during the first six months of 1959, the spirited response indicated a mounting interest. Perhaps it was the offer of a scale model Firebird III, or a color print of a dream car by George Walker that inspired the wide attention; maybe it was the challenge to show up the experts; whatever the reason, a thousand readers rushed their entries to beat the Dec. 31 deadline.

A gentleman from New York sent his guess on a 2 cent post card. Two cent post cards, of course, are now 3 cents, but this fellow wasn't a bit excited; he simply stuck a $1 stamp next to the 2 center, and mailed the card. In all fairness, it should be noted that the only difference between a dollar stamp and a penny one is 99 cents and a picture of Patrick Henry instead of Tom Jefferson, and—but why go on. When the postal clerks canceled the stamps, they did the best they could: They marked the card "Air Mail Special Delivery," and probably credited the overpayment to the postal deficit.

Red Report

A Scandinavian chief by the name of Rurik was invited to bring peace and order to the city of Novgord in the year 860, and that was the beginning of Russia, a country that seems to have been in the news ever since. Modern Russia is at once a challenge and a puzzle to the rest of the world; intellectually, philosophically, and politically they may be a thousand years ahead of us or a thousand years behind, depending on your belief in the gospel according to Marx, but no matter where they are, they compel a universal interest. The editors of STEEL recently undertook an editorial roundup of information that would shed some light on industrial expansion in Communist countries. It appears this week, beginning on Page 29.

Much of the material came from Communist representatives in the United Nations; some was coaxed from secret sources, and, for all we know, some may have come from spies. To our way of thinking, one of the most interesting segments of the story came from R. Westgate of Auckland, New Zealand. Mr. Westgate supplied the Chinese information, together with some remarkable photographs. Be sure to take a gander at the dilly showing iron production somewhere back of beyond in Communist China. Why, those sons of the dragon look more like a convention of beekeepers than a band of men dedicated to the erection of a perfect society.

From Hat to Verse

The hazards of reporting are not quite as alarming today as they were when we filed our stories from Mobile and Vicksburg—still feel twinges from an old Confederate Minie ball—but occupational risks are still encountered. Assistant Editor Don Hammerstrom recently was assigned to attend a press conference held in Cleveland by James E. Akins, American consul in Kuwait. Kuwait, as everybody in Kuwait knows, is a sort of a British protectorate on the northwest corner of the Persian Gulf. Hammerstrom was taking notes like mad when he observed that somebody had sat on his hat. What would Kipling have said to comfort his fellow scribe? Perhaps he would have intoned:

> You just takes your bloody pencil
> And you writes where e'er you're at,
> Though the blinkin' room is crowded,
> And they crush your bleedin' 'at!

Get in the Groove

Our professional mechanical engineer, William W. Johnson, Cleveland, kindly contributes a small puzzle for your consideration. He introduces a 10 in. record, together with the sworn testimony that it has a 7 in. playing space, and that it turns 225 times from start to finish. No evidence was offered about the make, or the artist, or the age, or even the price, but in spite of these notable omissions, Mr. Johnson wants to know how far the needle will travel when the record is played from start to finish.

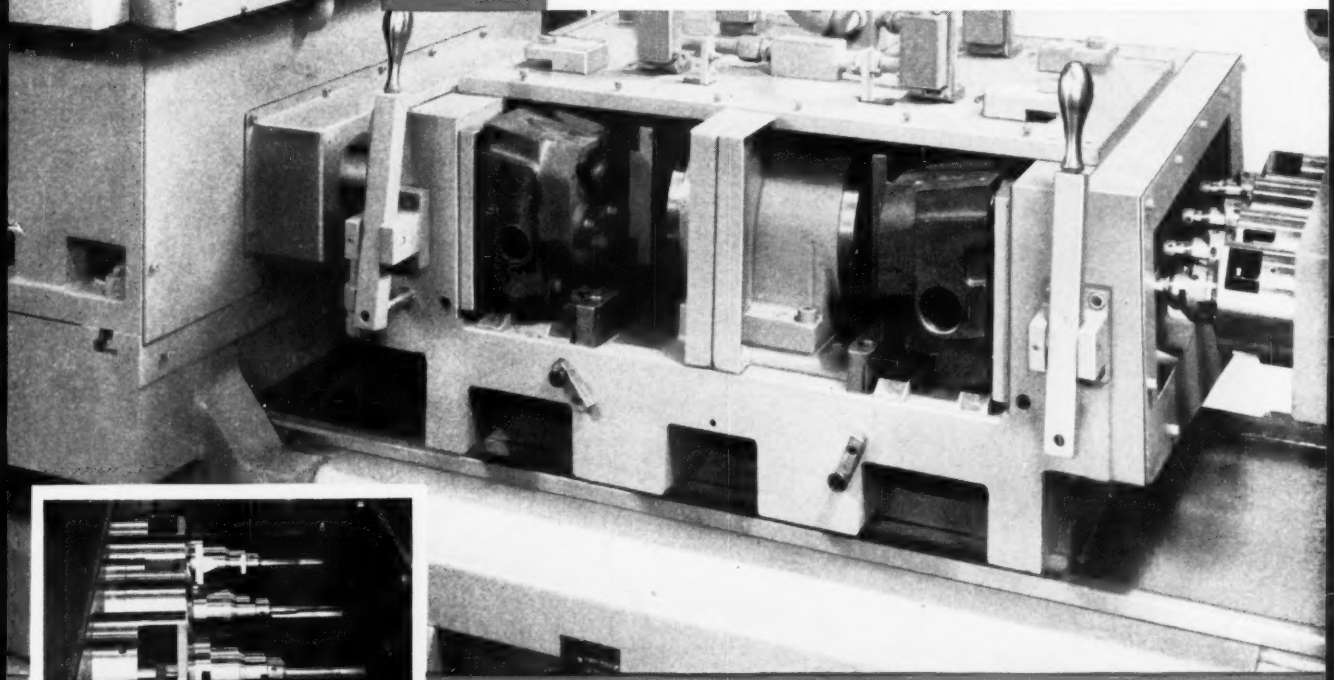
Shrdlu

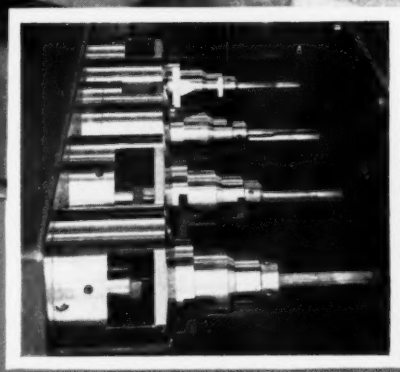
(Metalworking Outlook—Page 21)

XLO

EX-CELL-O FOR PRECISION

Intake valve seats and guide holes are machined at left end of machine, exhaust seats and guide holes at the right. Two-compartment fixture permits continuous machine operation.





Gun-type drills extend through spindle centers and retract automatically

CONCENTRICITY GUARANTEED

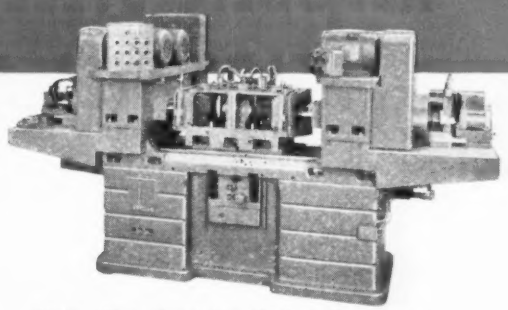
58-10

Bor-Drils valve guide holes and plunge-faces valve seats in one operation

A Standard Ex-Cell-O 17-A Precision Boring Machine, equipped for the Bor-Dril process, is turning out 23 cylinder heads per hour for a large auto manufacturer.

The table rapid-traverse feeds cylinder heads to the left into four cutters that plunge-face intake valve seats, then retract .020". Next, four gun-type drills advance through the spindle shafts to Bor-Dril guide holes from the solid—with guaranteed concentricity. The table then moves to the right, repeating the process on exhaust valve seats and guide holes.

Find out how the Bor-Dril process can help speed production in your plant; contact your local Ex-Cell-O Representative, or write direct.



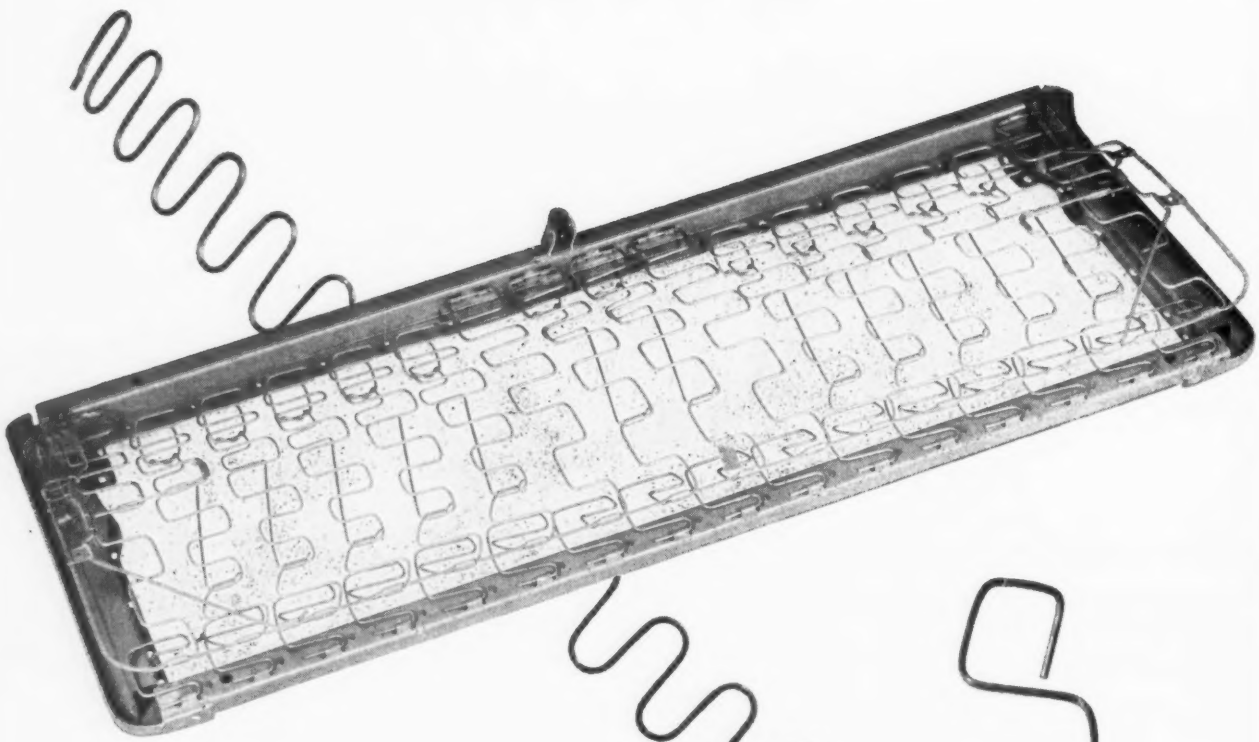
Style 17-A Precision Boring Machine equipped for Bor-Dril process drills deep holes from the solid with guaranteed accuracy.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

Machinery Division

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT



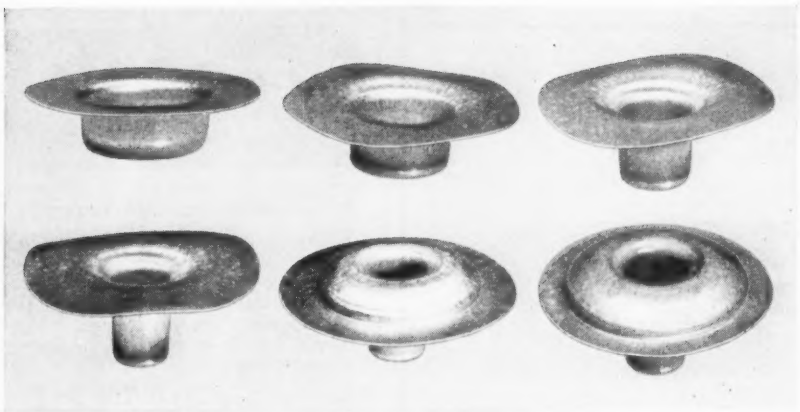
REPUBLIC STEEL WIRE HELPS SELL AUTOS

With today's sleek cars being built closer and closer to the ground, the design of functional—yet comfortable—front and rear seats becomes an increasingly complex problem.

The Seating Division of Rockwell-Standard Corporation, a major producer of car seats, has discarded the principle of high-type springing that limits space. Instead it uses Republic round, high carbon MB spring wire to fabricate a relatively flat spring unit called a "square formed" spring. The company also forms the wire into Zig-Zag springs. These two types result in comfortable seats requiring much less height.

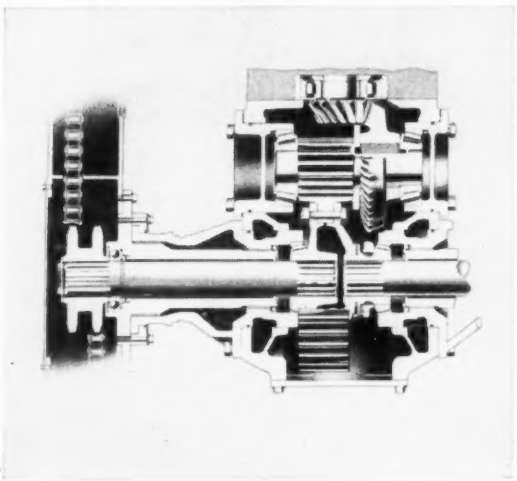
Each car model requires a different type of seat construction. Often, Rockwell-Standard has more than a hundred differently designed car seats going through its Seating Division. When a new design problem arises, it calls in Republic specialists on spring wire. These men help determine the proper quality that will take the severe forming and bending required in fabricating the springs.

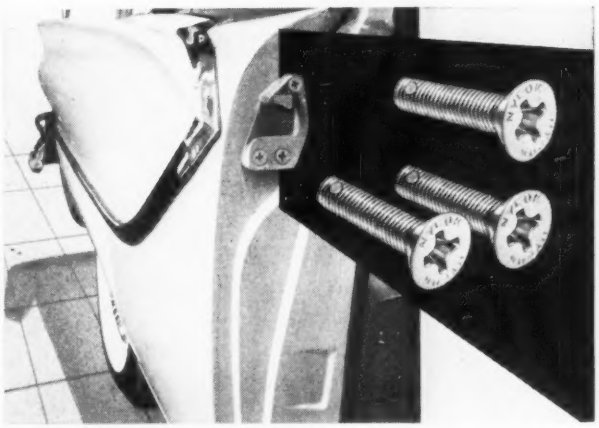
Whether your product calls for high or low carbon wire, Republic Wire Metallurgists are always available to work with you in selection, application, processing, and to make sure you get the best in quality. The coupon will let us know if you would like one to call at your plant.



HERE ARE SIX STEPS of possibly the severest manufacturing torture that a galvanized steel sheet can take. In its final form, it becomes the end piece of a muffler manufactured by the Mackenzie Muffler Company, Inc., Youngstown, Ohio. It is made out of Republic Continuous Galvanized Sheets. Despite the many deep drawing operations, the coating does not crack, flake, or peel. Republic Galvanized Sheets can do a profitable job for you. Clip the coupon and mail it in for more information.

SAFETY COMES FIRST—in the door latching of Ford cars. So Ford engineers have specified Republic Nylok Bolts to anchor the striker plate to the door post. Nylon pellet insert in bolt body forces a tight metal-to-metal lock between mating threads for a positive, vibration-proof clamping action. Republic Nylok Bolts are adjustable and reusable with no loss of holding power. Send coupon for descriptive folder.





EXCEPTIONALLY HIGH STRENGTH-TO-WEIGHT RATIOS plus resistance to fatigue, stress, shock, and impact are values of Republic Alloy Steels that equipment builders have been relying on for years. Engineers and metallurgists of the Adams Division, LeTourneau-Westinghouse Company, for example, spent thousands of hours on research and testing of all types of steels to find one that would reduce ultimate fatigue to an absolute minimum in the drive axle of their "660" Motor Grader. They selected Republic Hot Rolled 4340 Alloy Steel. This fine steel not only resists fatigue, but also is able to take high torque without a permanent set. Specify Republic Alloy Steels where strength and toughness must resist heavy-duty roughness. Our metallurgists will help you.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST-5509-R
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a Wire Metallurgist call.
Send more information on:
☐ Wire ☐ Continuous Galvanized Sheets
☐ Nylok Bolts and Nuts ☐ Alloy Steels

Name_____ Title_____
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Coming Jan. 5

STEEL's

METALWORKING YEARBOOK AND PLANNING GUIDE

The Changing Role of Metalworking Managers

Within two decades we have gone through a social, technological, and economic revolution that has profoundly changed executives' jobs and responsibilities. This article will tell what the shift means and what to look for in the future.

What Metalworking Management Expects

STEEL's annual surveys of what 7500 managers see for the year ahead are winning increasing exceptance. Check your planning and forecasting against their estimates. For 1959 they will predict higher production than in 1958.

Facts and Figures

This is becoming an almanac as more and more readers use the statistical compilation on production, sales, labor, prices, earnings and many other subjects.

Forum on Technological Progress

Looking for a better way to make a product? Seeking markets for materials and equipment? You'll find it profitable to check this special section where 300 authorities will tell what's developing or likely to come in processes and materials.

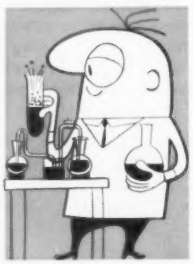
LETTERS
TO THE EDITORS

Article Balances with Thought

I would appreciate a copy of "Top Talent Is Tougher to Get" (Oct. 27, p. 38). It balances with many of the forecasts and thought we have held for the last two years. We feel the need for additional thought in presenting a program to management.

E. Jack Shannahan
Employment Manager
Lenkurt Electric Co. Inc.
San Carlos, Calif.

Readers Request Usable Formula



"Breakeven Point: Route to Better Decision Making" (Dec. 1, p. 40) was quite interesting and informative. I would appreciate a copy of this article.

John G. Barry
Teflon Supervisor
Polymer Corp.
Reading, Pa.

• • •

I am much interested in your article . . . and I would appreciate a duplicate copy.

Joseph Cucchia
Chief Industrial Engineer
Lear Inc.
Santa Monica, Calif.

• • •

Please send two copies of this article. It presents the concept clearly and will be most helpful to this command.

Walker Evatt
Business Analyst
Headquarters
Ordnance Tank-Automotive Command
Detroit

• • •

Will you forward three copies for our use and future reference?

K. C. Jasper
Chief Engineer
Model Engineering & Manufacturing Inc.
Huntington, Ind.

His Auto Still Rattles

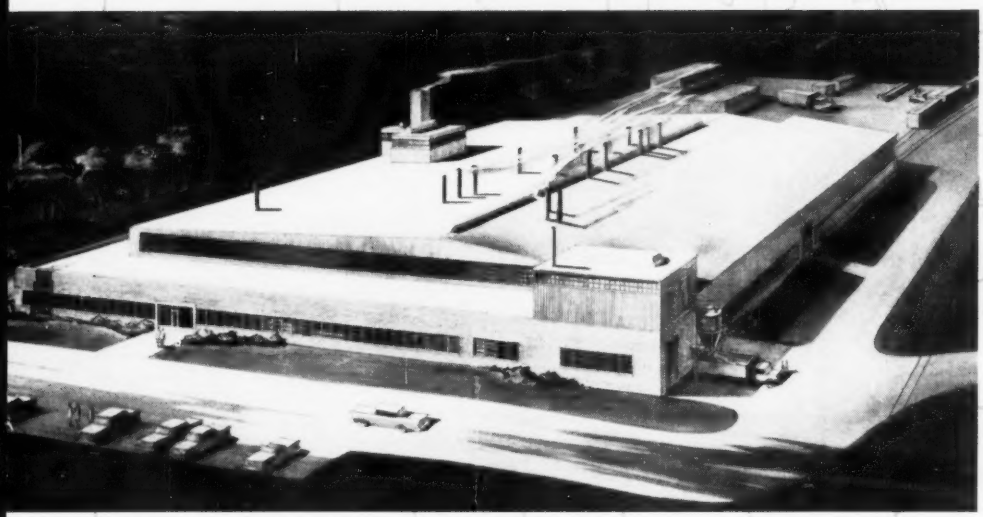
I have read with much interest "Shh! Chevy Noise Patrol at Work!" (Dec. 1, p. 51).

I purchase a new Chevy every two years and the automatic gear shift lever in my 1958 Bel-Air rattles continually, especially when idling or at low speeds. Also there is a body creak in the area

(Please turn to Page 12)

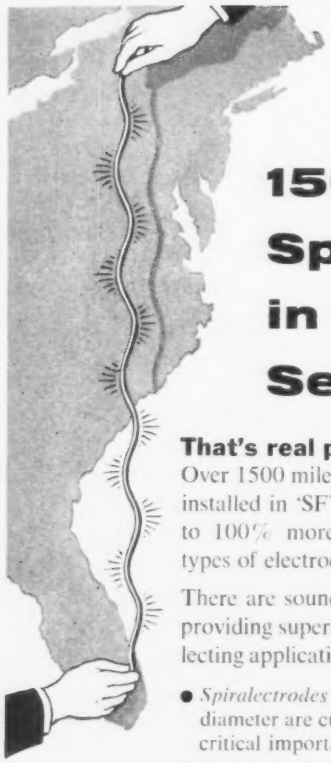
Now producing . . . Federated quality aluminum casting alloys from the world's most modern aluminum smelter. New convenience, faster service from the new Alton, Illinois plant and the same rigid quality controls that distinguish all Federated products. This modern smelter can produce every specification of aluminum alloy. And Federated field metallurgists back up every shipment of Alton aluminum ingot with on-the-spot assistance based on long experience. For a broad choice of aluminum casting alloys, call your nearest Federated sales office. There are 23 of them to serve you promptly. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY

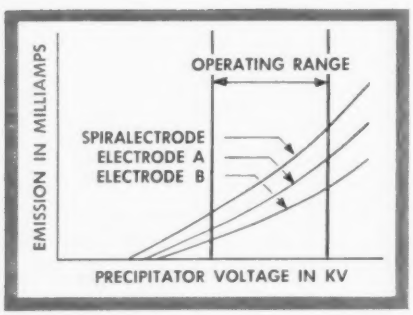


1500 miles of Spiralectrodes in Precipitator Service!

That's real proof of superior performance. Over 1500 miles of these emitting electrodes have been installed in 'SF' electric precipitators . . . delivering 50 to 100% more electron emission than conventional types of electrodes.

There are sound reasons why Buell *Spiralectrodes* are providing superior emitting efficiency in actual dust collecting applications.

- *Spiralectrodes* are *"emission engineered"* – pitch and diameter are custom designed for each application . . . of critical importance with high resistivity dust.
- *Spiralectrodes are precision made from stainless steel*– of uniform quality, corrosion-resistant.
- *Spiralectrodes minimize efficiency-loss of dust build-up* –no horizontal surface to collect dust, positive rapping cleans electrodes.
- *Spiralectrodes maintain predetermined tension* – (no weights required) . . . dampen effect of vibration caused by electrical pulsation, thereby minimizing electrode breakage.
- *Spiralectrodes'* controlled area emission stops sparking effect of "point emission."



Above chart illustrates the superior emission of the Spiralectrode: its corona voltage is lower and its emission is higher than other types of emitting electrodes over the entire operating range of industrial precipitator voltage.

The superior operating characteristics of Spiralectrodes contribute to continued high efficiency of Buell 'SF' Precipitators. Detailed information of this and other exclusive features are described in a booklet, "Buell 'SF' Electric Precipitators." Send for your copy: write Dept 26-L, Buell Engineering Company, Inc., 123 William Street, New York 38, New York.

buell®

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

LETTERS

(Concluded from Page 10)

of the dash or right front door post.

There is a possibility the Chevy engineers have an answer. If so, I would appreciate getting it.

Howard E. Decker
Orton Crane & Shovel Co.
Huntington, Ind.

Reading Series...Best Time Spent

It is always with great interest that I read and study your "Program for Management" articles. I keep a file of them in my desk and I personnally feel that reading them is some of the best time spent. Other people use the file and I have just discovered No. 4 and No. 7 missing. May I have another copy of each?

Thank you for the good work you have done in this series.

John R. Musch
Sales Engineer
Koehring Div.
Koehring Co.
Milwaukee

• • •

May I have copies of the 1958 Program for Management articles for my personal file? I find them most informative and use ideas from them regularly.

R. H. Yost
Chief Engineer
Production Engineering Dept.
Remington Rand Univac Div.
Sperry Rand Corp.
St. Paul

• • •

Please send me copies of articles No. 1 to 7 inclusive. These are comprehensive and timely, and you deserve much credit for this service.

J. Keith Mills
Time Study Engineer
Meilink Steel Safe Co.
Toledo 6, Ohio

High Interest in Pensions

While in a client's office, I read "Feeling the Pinch for Pensions?" (Nov. 17, p. 68). Will you please send me a reprint?

George M. Zimmerman
Zimmerman Insurance Agency
Detroit

• • •

Please send three copies of this article.

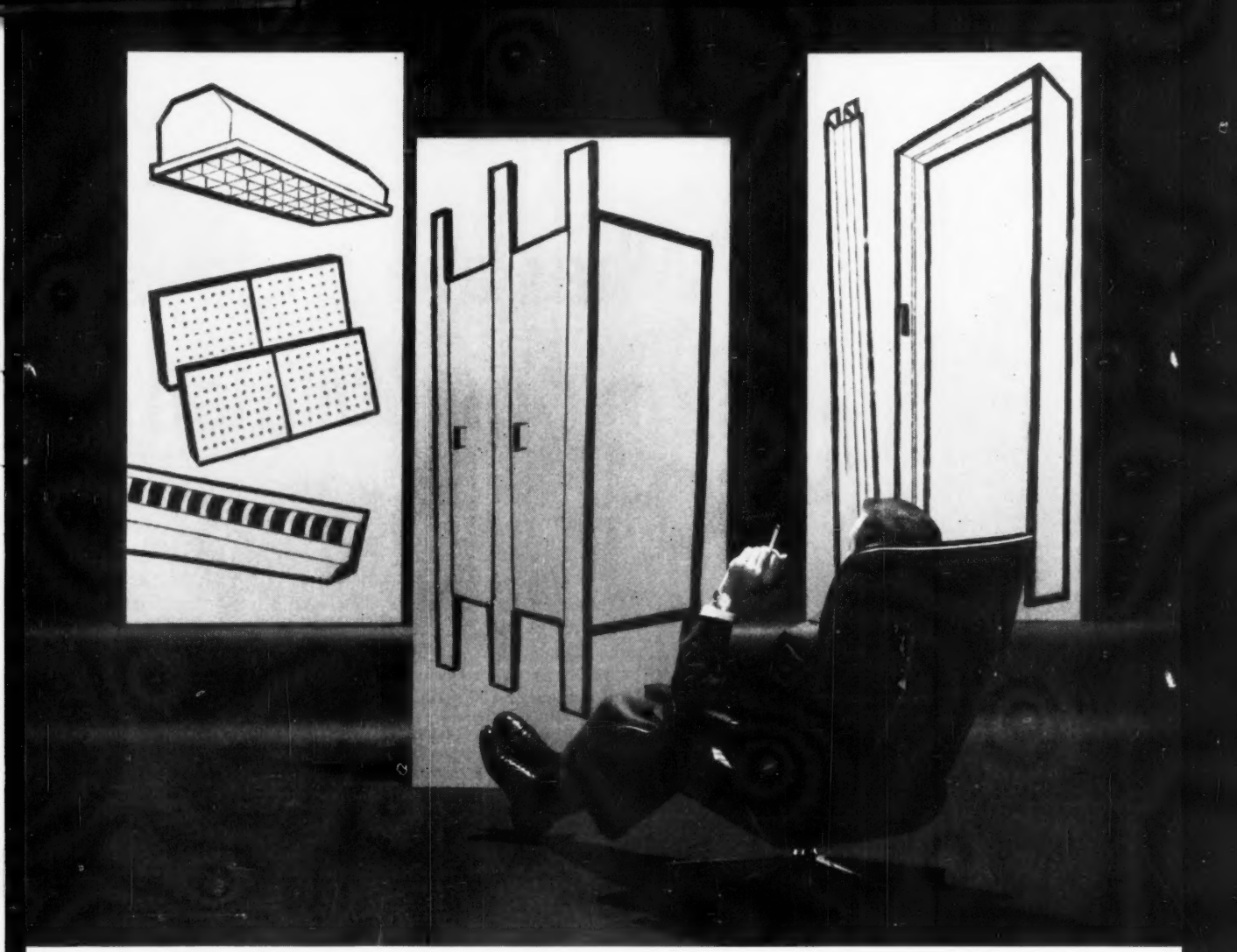
H. H. Izant
Cochran-Izant & Co.
Los Angeles

Seeks New Guide

For a number of years, we have used your "Guide for Selecting Tool Steels & Carbides" and are wondering whether you have issued a revision lately. If you have, we would appreciate a dozen.

E. F. Junger
Junger Steel & Supply Co.
Minneapolis

• *A revision of the guide was made Apr. 21, 1958. Copies are still available.*



THE EASY WAY TO PREVENT CORROSION IN YOUR PRODUCT? SPECIFY ZINC-COATED STEEL SHEETS, OF COURSE!

There's just nothing like zinc-coated steel sheets for enduring, economical corrosion prevention in the products you manufacture such as light troffers, metal ceiling tiles, baseboard heating units, sliding door hardware and scores of other products.

Take the formability of such sheets, for instance. With either electrolytic or continuous process zinc-coated steel, the tight coating can take the severest fabrication operations and never flake or peel. Result: permanent corrosion resistance for longer life and lasting beauty. First cost: low. Maintenance costs: nil.

How about paintability? Electrolytically zinc-coated steel sheets, chemically treated, are unexcelled for painted products. Paint digs in and holds its unbroken smoothness and beauty for keeps.

In electrolytic zinc-coated steel, the name that stands out is Weirzin. In continuous process zinc-coated steel sheets, it's Weirkote. Let us show you how Weirzin or Weirkote—or both—can help you meet your manufacturing requirements better.

Write for free informative brochure on each today. Weirton Steel Company, Dept. B-2, Weirton, W. Va.

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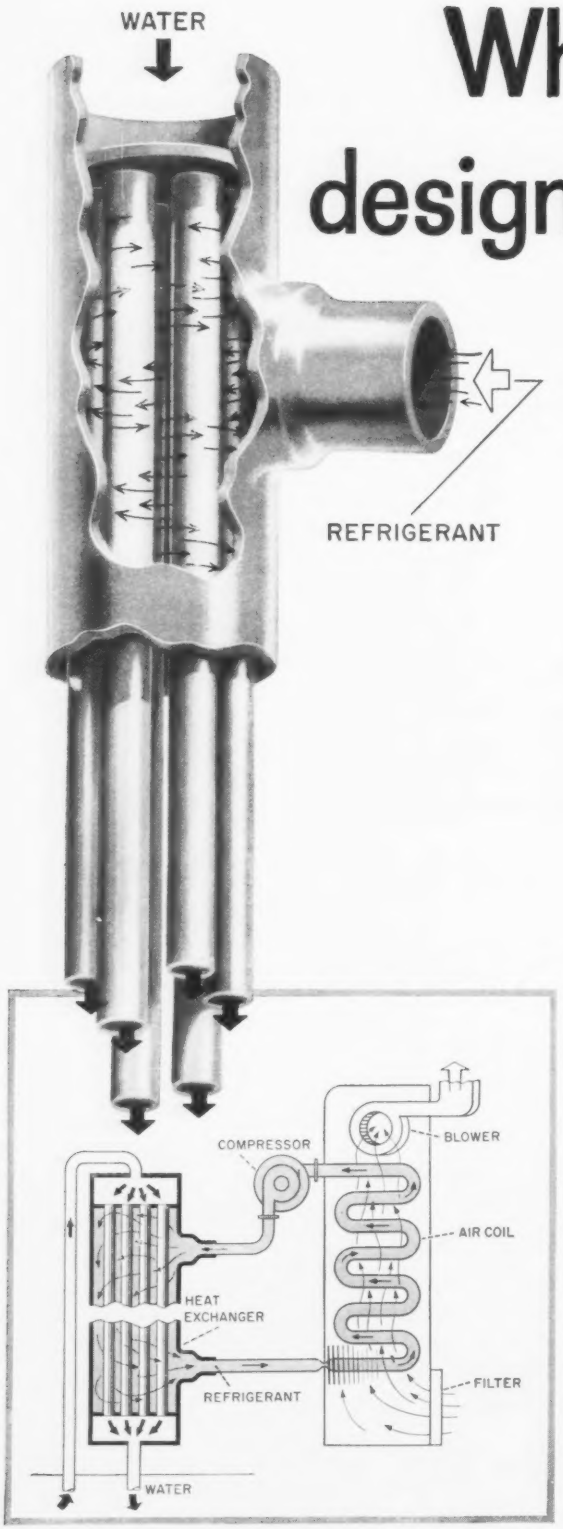
What are today's design possibilities?



Design possibilities with the copper metals are as varied as these metals themselves. The forty-two industry standard alloys and the hundreds of special copper alloys offer combinations of electrical, thermal, chemical, structural, joining and finishing properties which are more valuable in this day of rigid performance specifications than ever before.

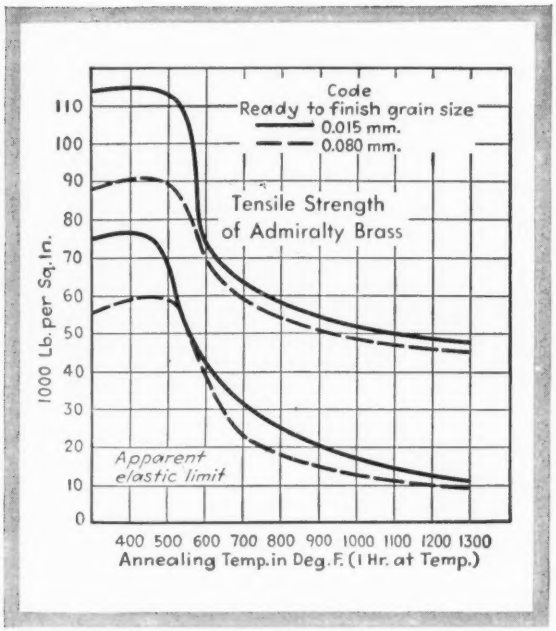
Today, most parts must meet several material requirements. Even a fastener, in addition to strength, may need corrosion resistant and high-finish properties. A supporting member may also have to conduct heat. Efficiency calls for materials versatility. And versatility calls for the copper metals. Although used since 7500 BC, copper is being re-examined as a new material with design possibilities that have scarcely been tapped. Here are some of the problems, and some of the properties that have special meaning at this time:

Design Problem — Heat pump condenser

The tube-in-tube condenser in a Typhoon Heat Pump must transfer heat between the ground water and the recirculating refrigerant. Corrosive sodium and sulphur compounds are dissolved in the ground water. The refrigerant, being highly volatile, must be confined in a leakproof system. The house air must be heated in winter and cooled in summer by passing over heat-transfer coils. The design requirements, then, include corrosion resistance, heat conductance and impermeability to the refrigerant. These requirements are met by three forms of copper. The ground water is contained in Admiralty Brass because of its excellent resistance to salt and sulphur corrosion. The refrigerant is contained in commercially-pure copper because of its density and the impermeability of its soldered joints. The air coil is a tinned copper fin soldered to a copper tube for maximum heat transfer at a realistic cost.

The good heat conductivity of copper and Admiralty Brass is, of course, important. But the conductivity of the metals themselves would be of little use if they did not also resist corrosion. The reason for this (besides durability) is because a heavy layer of corrosion products would severely reduce transfer efficiency.

TYPHOON HEAT PUMP CONDENSER SECTION (shown actual size). Heat exchange between ground water and refrigerant is accomplished in this unit. The corrosion resistance and high heat conductance of the copper metals used are vital to efficient operation. Drawing at bottom shows the complete cycles schematically.



← **EFFECT OF ANNEALING ON TENSILE STRENGTH** and apparent elastic limit of admiralty-metal strip, previously cold-rolled 6 B. & S Nos. (50% reduction of area) from two different grain sizes, 0.015 and 0.080 mm. (0.040-in. stock).

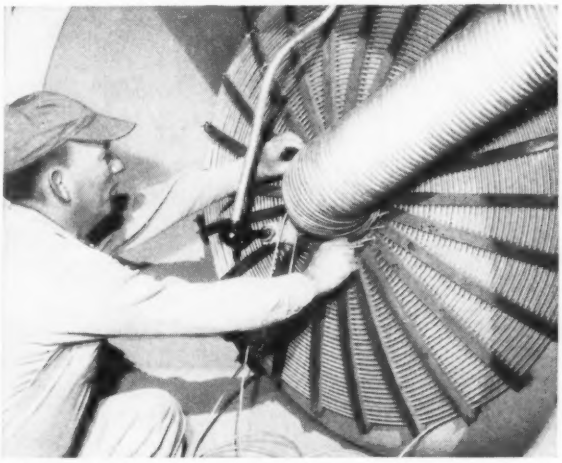
As with any piping system, impact and tensile strengths of the groundwater tubing are also important. Slight shifts in the substrata can produce heavy stresses. Admiralty Brass, as manufactured for this tubing, develops a tensile strength of the order of 45,000 psi. Many copper alloys are even stronger. The high-zinc brasses, nickel silvers, beryllium copper, the silicon bronzes and the phosphor bronzes can be processed to provide tensile strengths of the order of 140,000 psi for hard-drawn wire. Strengths, of course, vary with temper. The graph above illustrates the range of strengths for Admiralty Brass.

Design Problem — Preheating for atomic reactor

The induction heating coils used in the Organic Moderated Reactor Experiment, a nuclear power project operated by Atomics International, a division of North American Aviation, Inc., for the Atomic Energy Commission, keep the organic moderating compound in a fluid state during reactor startup and shutdown. The necessary high temperatures are generated by eddy currents in the reactor tank. The design requirements for the coils were high electrical conductivity and good high-temperature characteristics. Oxygen-free, high-conductivity copper was the answer. Its freedom from impurities assures high conductivity and guards against high temperature oxidation and scaling.

Design Problem—Yours

The combination of properties that you need for today's multifunction design requirements can probably be found among the copper metals. The copper industry will help you find it. The Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y., will welcome your inquiry.



COPPER COILS being installed on the bottom of the main core vessel of the Organic Moderated Reactor Experiment.

FINISHING REQUIREMENTS. The nickel silvers and low-zinc brasses are widely used in ornamental applications because of their ease of plating and finishing as well as their cold-working properties. The new fine-grain brasses offer an ideal surface structure for economical high finish.

The picture above shows various combinations of coppers and brasses used decoratively in housewares.

THERE'S A NEW FRONTIER IN...

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there's so much to choose from at...

HOTEL CLEVELAND

Bronze Room

One of the brightest of the city's supper clubs. Dancing nightly from 9.00 p.m.
Air conditioned, of course.

Rib Room

A true specialty restaurant
For Fabulous Roast Beef,
roasted, carved and served
to your order

MEN'S BAR

Strictly stag — is this all male haven for good drinks, good food and good talk. Plus sports events on TV.

TRANSIT BAR

For rapid service in the most unique bar in the country . . . decorated with an outstanding collection of miniature trains.

the PATIO

Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

Coffee Shop

Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

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CLEVELAND, OHIO

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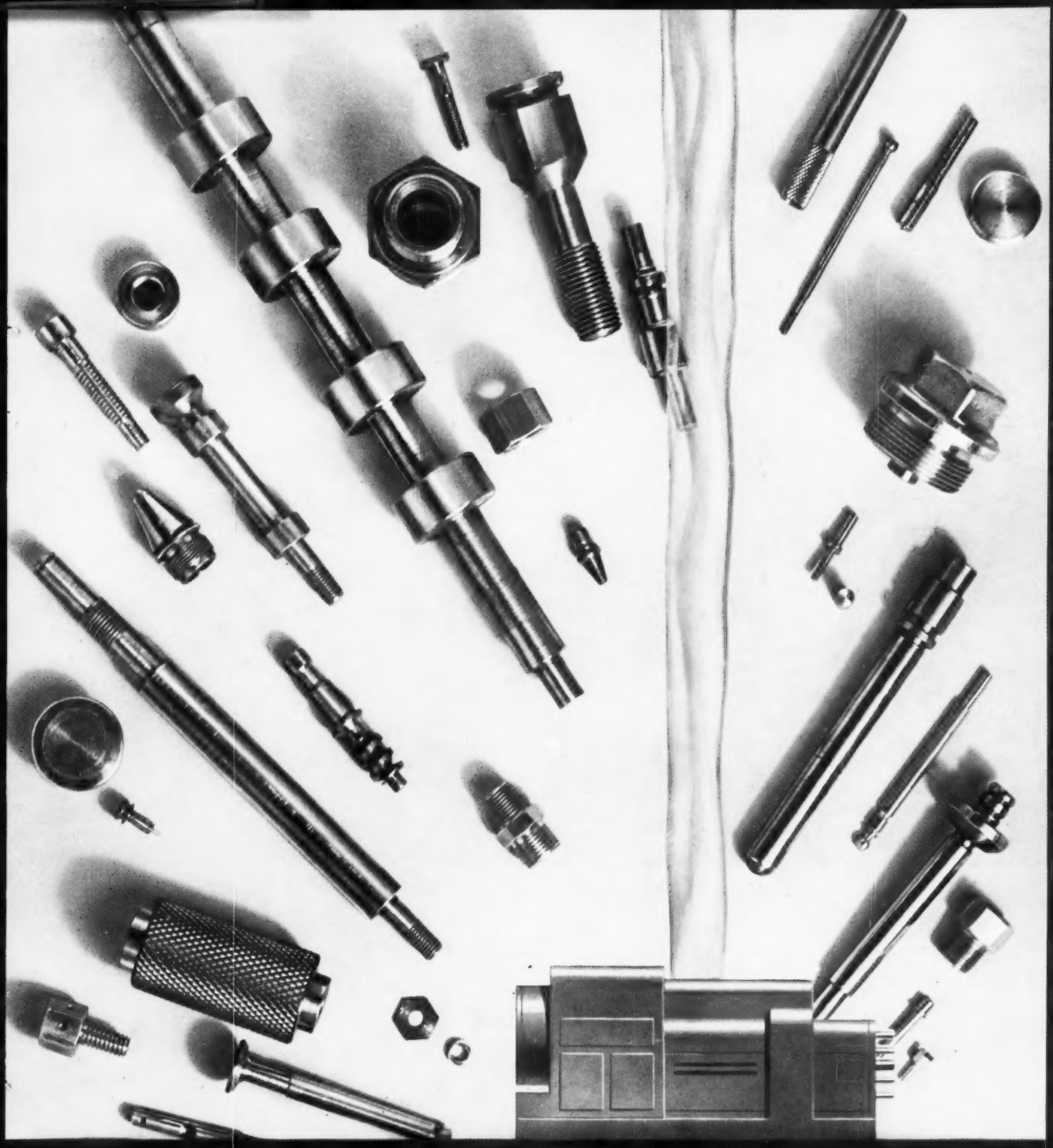


1/3 MORE PRODUCTION FROM 7 OUT OF 10 AUTOMATICS

with

the Texaco Cleartex Cure

TEXACO

3 TO 8 GALLONS OF LUBE OIL PER SHIFT leak into the cutting oil sump on 7 out of 10 automatics now operating. This cumulative reduction of cutting oil efficiency is actually to blame for many screw machine problems.

SHORT TOOL LIFE due to chip weld, cratering, burning, can often be traced directly to lube oil dilution of cutting oil effectiveness. Your

Diluted cutting oil causes costly troubles in automatic screw machines . . . short tool life . . . frequent downtime. Diluted cutting oil can be cured . . . forever! Prove it yourself . . . Start the Texaco

saving in tool regrinds, tool replacement and downtime offsets the price of premium Cleartex many times over.

A CRITICAL SYMPTOM of cutting oil dilution in your automatic screw machines is excessive scrap production. Another, and earlier one to watch for, is frequent need to refill lubricating oil sumps.

HERE'S HOW: First, call in a Texaco Lubrication Engineer. Let him survey your automatic set-up—metals being machined, operating conditions, etc. Then, if your automatic screw machines are of the vast majority that can benefit from the Texaco Cleartex Cure, use a Cleartex Oil for *both* cutting and lubricating in just one machine as a test. On 70% of automatics in use today, men in charge of production and maintenance run into recurring troubles that they can actually cure with this one decision.

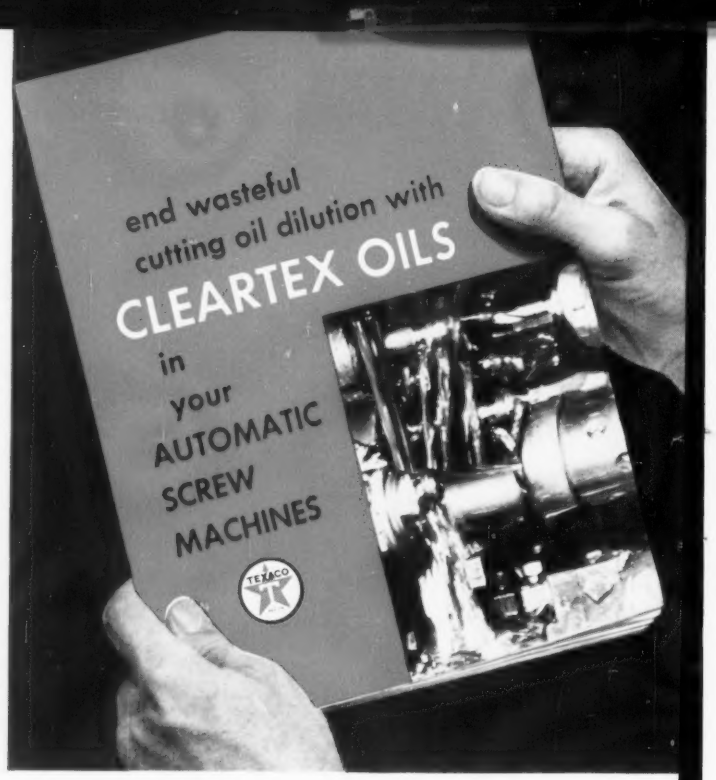
Cleartex Cure

TURN PAGE FOR DETAILS OF METHOD

TEXACO

SEND FOR THIS NEW TEXACO BOOK NOW!

To do your job . . . stop waste and boost output . . . compete better on quality . . . you need to know what Cleartex Oils can do in automatic screw machines. This book spells it out.



See for yourself how Cleartex helps you reduce operating costs

How Cutting Oil Is Diluted

When lubricating and hydraulic oils leak into the cutting oil sump, the cutting oil is diluted. It loses strength; ingredients that make it an efficient cutting oil become less and less effective. This happens more frequently than is realized.

One way to make a quick check is to keep a record of how much lubricating oil (or hydraulic fluid) is being added to a machine. Lube oil make-up is a good measure of dilution on the cutting oil side and a sign that tool life and production is probably being lost.

Cleartex Cures the Problem

Texaco Cleartex Oils were developed to cure this problem forever.

The Cleartex Series are transparent, non-corrosive products. Despite their non-corrosive features, they do have relatively high extreme pressure properties, which make them well suited as general purpose cutting oils for use in a wide variety of operations where requirements are normal.

On non-ferrous metals, they are particularly effective because they are non-corrosive.

They are also excellent as machine tool lubricants and hydraulic fluids, principally because of their exceptional chemical stability, load carrying ability and rust preventing properties. Thus, they are truly efficient dual or tri-purpose oils. In addition, Cleartex Oils have excellent odor, color, E.P. properties, corrosion protection.

How to Set Up a Test

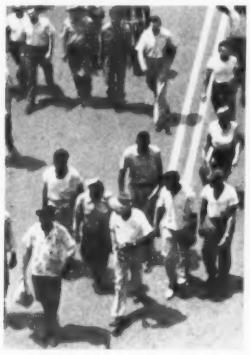
Cleartex Oils are demonstrably superior to any dual or tri-purpose lubricants available today. It also seems apparent that the cost of operating 70% of the automatic screw machines can be reduced by the use of a Cleartex Oil. We say this because on automatic screw machines that now use the new Texaco Cleartex Oils for cutting, lubricating, and (if needed) hydraulic fluid, difficulties of short tool life, rejects and downtime have been cured, or definitely reduced.

Why don't you arrange with a Texaco Engineer to make a test on one machine—or on an entire line if you want to go for the savings immediately. Contact any one of Texaco's 2,000 Distributing Plants in the 48 States, or write to The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Steel Labor Prospects Ominous Next Year



In your planning for 1959, allow for a possible steel strike. Both sides are talking as if they'll have one. The steel industry is tired of being made the scapegoat for inflation and is determined to win a pact which does not boost employment costs higher than gains in productivity. A key point will be the definition of productivity. Take the union definition of output per manhour and you'll come up with average annual gains of 3.9 per cent in the past nine years. Take steel management's definition, which includes capital investment with output per manhour, and you'll come up with annual gains of 3 per cent (Page 29). But steelworkers will ask initially for 30 cents an hour or more in wage hikes.

How To Boost Indirect Labor's Efficiency

You're fortunate if the productivity of your indirect labor exceeds 60 per cent of standard, say experts in work measurement. They believe it's time to improve the efficiency of this growing segment of your work force. One way is through wage incentives (Page 31). Jack & Heintz Inc., Cleveland, proved that by shaving its labor force and substantially reducing other costs via a new work measurement and incentive plan.

Steel Prices, 'Extras' To Be Stable in First Half of 1959

Look for fairly stable steel prices the next six months (Page 88). True, there may be an occasional flurry. Example: Crucible Steel Co. of America raised a few stainless products ten days ago. And there may be some shifts in extra charges, but don't look for sweeping changes on the order of those put through early in 1957. The promise of price stability from aluminum producers increases the pressure on steelmakers to hold the line because the metals are growing more competitive. Steelmen also believe their arguments would be weakened in the coming labor negotiations if they moved up on prices before or during the talks.

Full Employment Act Gets Study

The Joint Economic Committee has just heard business, labor, and academic economists discuss the relation of prices to economic growth and stability. The major question: Should the Full Employment Act include a reference to stable prices? Business generally said yes; labor, no. William Baumol of Princeton suggested tax advantages might be given to firms that set prices in the "national" interest. This committee will conduct a special investi-

gation of inflation next year, under the chairmanship of Sen. Paul Douglas (D., Ill.) who favors tax cuts.

Conservatives Still Hold Edge

Still depressed by Democratic victories at the polls in November? Odds are that on matters of vital concern to metalworking (taxes, domestic and foreign aid, labor laws), the Southern Democrat-conservative Republican coalition will hang on to its voting edge. Advocates of thrift in federal spending will also outnumber the spenders in the next Congress (Page 38).

New Great Lakes Route Sought

American President Lines Ltd. has asked the Maritime Administration for a subsidy to serve the Great Lakes-St. Lawrence Seaway-Mediterranean route. Ships used would be the *President Arthur* and *President Harding*, reportedly faster and larger than any foreign flagships in the trade. Proposed are one to two sailings a month between Chicago, Milwaukee, Detroit, Toronto, Montreal, and eight European ports. American Export Lines is the only other U. S. flag operator to apply for a similar route.

Arkla Goes to the Past for the Future

A gas utility has diversified into metalworking and other industries to boost its earnings 32 per cent in one year (Page 41). To make this case even more remarkable, Arkansas Louisiana Gas Co. has moved into fields considered dormant, even dead, by many—gas air conditioning equipment, gas lighting fixtures, and, of all things, buggy manufacturing. In the 12 months that ended last Oct. 1, Arkla sold 7500 air conditioners, more than triple the number sold in Servel Inc.'s last year of operation—Arkla bought the business from Servel. The utility is also in cement, financing, pipelines and chemicals.

Foreign Costs Not Always Lower

Are total manufacturing costs abroad always lower than ours? A study by the National Industrial Conference Board covering 192 sets of comparative cost data for 90 different products shows: Unit labor costs are lower abroad in 105 more instances than they are higher; unit overhead costs are lower abroad in 27 more cases than they are higher; unit material costs are higher abroad in 46 more cases than they are lower. Net result of the interplay of these three cost categories is that total unit costs in foreign nations are lower than their U. S. counterparts in 85 instances and higher in 70; thirty-seven are roughly equal.

Economic Indicators Rise

Private housing starts, on a seasonally adjusted basis, climbed to a yearly rate of 1,330,000 in November, the highest since June, 1955 . . . Orders received by industrial material handling equipment makers came out of a two-month slump in October with an increase of nearly 26 points over bookings reported in September . . . Look for trucktrailer production to hit 60,000 in 1959, vs. 44,500 in 1958 . . . Orders for new freight cars in November were 6295, compared with 781 in October and 1070 in November, 1957.

Call for a Metallurgical Sherlock Holmes

If you're a metallurgical Sherlock Holmes, you're needed in auto plants and steel mills (Page 47). Many of them are troubled with ghost lines on the surface of sheet steel. The lines are especially noticeable on flat stampings for hoods and roofs. They're causing hood rejects as high as 25 per cent at one plant. They can look like broad stripes, sometimes like a series of toothpicks, or shiny pencil lines. Nobody knows exactly what causes them, or why they appear, then disappear. Do you?

Industrial Trucks Expect Lift

Mark up another industry that expects a sales climb in 1959. Industrial truck manufacturers think they'll recoup the 25 per cent sales dip experienced in 1958 with a 25 per cent improvement in 1959. A large slice of the industry's business will come from companies which want to prune in-plant handling costs, says William Van C. Brandt, managing director for the Industrial Truck Association.

Red China Drives To Catch the West

Don't discount China's industrial accomplishments. It nearly doubled steel output from 1957 to 1958. It has the population and other resources (except oil) to eventually become the most powerful industrial nation on earth. China, not Russia, may someday be the dominant Communist country (Page 32). Although Red China's dominance is still years away, now is the time to appraise our political and economic attitude toward the nation.

Do Babies Mean Business?

We've heard a lot of talk about "babies mean business." But listen to Forrest H. Kirkpatrick of Wheeling Steel Corp.: "There has been too much emphasis on the population curve as a major business indicator. Babies result from good business, not vice versa. Attempts to forecast corporate earnings on the basis of generalities about the country's long term growth

are unrealistic and misleading. Let us relate corporate prospects to the realities of foreseeable volume and profit margins."

Cutting Fastening Costs

If any of your products require a lot of sheet metal fastening, you may get a cost-cutting idea from an aircraftmaker. His problem: Riveting wing sections. He solved it by using a tape-controlled riveter that positions the parts, fires the rivets, drills, and countersinks the holes (Page 68). Results: A 25 per cent reduction in manhours needed for the job.

Plasma Arc Tames Tough Metals

Using a principle that can whomp up a cracking 100,000° F, Union Carbide Corp.'s Linde Co. has developed a torch that melts practically anything and deposits it on molds or forms. It's a real breakthrough if you use hard-to-handle materials that resist high temperatures. For example, rocket vanes that are plasma arc coated with pure tungsten withstand 5500° F, mile-a-second blasts of a rocket engine exhaust (Page 78).

People Flock To Southern California

Southern California's population boom will continue during the next two decades, and the total will reach an estimated 17.3 million by 1980, nearly double the present number. The Los Angeles Chamber of Commerce says that Orange County will grow the most, with an expected gain of 241 per cent in the next 22 years, from 560,000 now to 1.9 million. Los Angeles County will grow from 5.7 million now to 9.9 million in 1980.

Research Spending To Hit $21 Billion by '67

Investment in research and development (now $7 billion) should hit $12.5 billion by 1962 and $21 billion by 1967, predicts Kenneth Andersen of the Scientific Apparatus Makers Association. Apparatus makers sold only a little more than $1.5 billion worth of equipment in 1958, 5 per cent under 1957. But they look for an 8 per cent gain in 1959.

Straws in the Wind

Some 20 utility, steel, and furnace equipment firms will sponsor an eight month technical-economic study at Battelle Memorial Institute to learn under what circumstances, present and future, electric furnaces will be used to smelt iron ore in the U. S. . . . Dominion Steel & Coal Corp., a subsidiary of the A. V. Roe industrial complex, is negotiating for the construction of hot and cold rolled steel mills at Contrecoeur, near Montreal . . . West Germany's August Thyssen-Huette and Phoenix-Rheinrohr will merge to form a steel giant with 6 million tons in ingot capacity if the High Authority of the European Coal & Steel Community approves . . . Philco Corp. will boost prices Jan. 2—$10 to $20 on all television models and $20 on washer-dryers.

GET MORE PRODUCTION PER DOLLAR INVESTED

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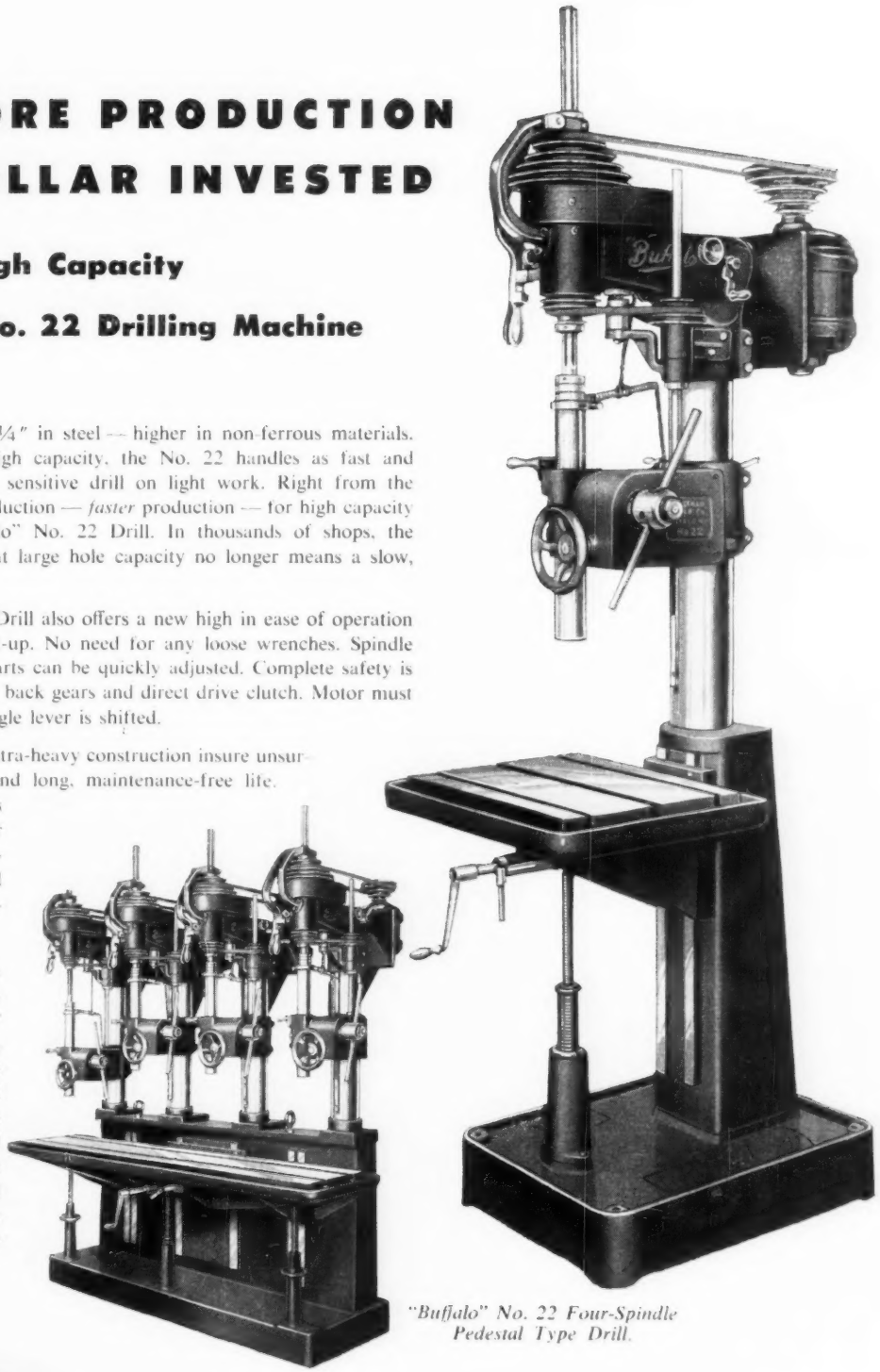
"Buffalo" No. 22 Drilling Machine

Its rated capacity is 1¼" in steel — higher in non-ferrous materials. Yet, in spite of its high capacity, the No. 22 handles as fast and smoothly as a regular sensitive drill on light work. Right from the start you get more production — *faster* production — for high capacity work with the "Buffalo" No. 22 Drill. In thousands of shops, the No. 22 has proved that large hole capacity no longer means a slow, cumbersome machine.

The "Buffalo" No. 22 Drill also offers a new high in ease of operation and convenience of set-up. No need for any loose wrenches. Spindle feed stops and other parts can be quickly adjusted. Complete safety is afforded by interlocked back gears and direct drive clutch. Motor must be cut off when the single lever is shifted.

"Buffalo" design and extra-heavy construction insure unsurpassed dependability and long, maintenance-free life. Steel column provides ample rigidity under drilling pressure. Accuracy is further attained by precision ball bearing spindle.

For high production, high capacity drilling, tapping and other machining operations, be sure to investigate the "Buffalo" No. 22 Drilling Machine. Available in floor or pedestal types, and multiple units up to six spindles. Call your "Buffalo" machine tool dealer, or write for Bulletin 2989-H.



"Buffalo" No. 22 Four-Spindle Pedestal Type Drill.

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What People Want To Know

We believe this is an especially appropriate time for management to think about improving communications with its so-called labor force.

Management people and labor people are pretty much the same. They get married, rear children, see the same movies and TV shows, eat the same breakfast foods, drive the same cars.

But labor unions make a distinction. They put management in one class, labor in another. This inherently hostile setup is perpetuated by union leadership via hard-hitting, though often distorted, communications. For example, it keeps its members stirred up by blaming management for inflation.

In contrast, management too often does a haphazard or ineffective job of communicating.

On top of that, supervisory people set up roadblocks so the workers don't learn what management really has in mind.

Company publications, which give management an excellent opportunity to communicate, are filled with trivialities, such as fishing trips, new babies, and retirements. Controversial subjects are avoided.

Laboring people, like management, want to take pride in their work and their company.

They want to be convinced that the work they are doing is important.

They want to know where management stands on controversial issues, so they can make up their own minds.

They want to know about the company they work for, including its plans, business prospects, competition, new products, profits, and problems.

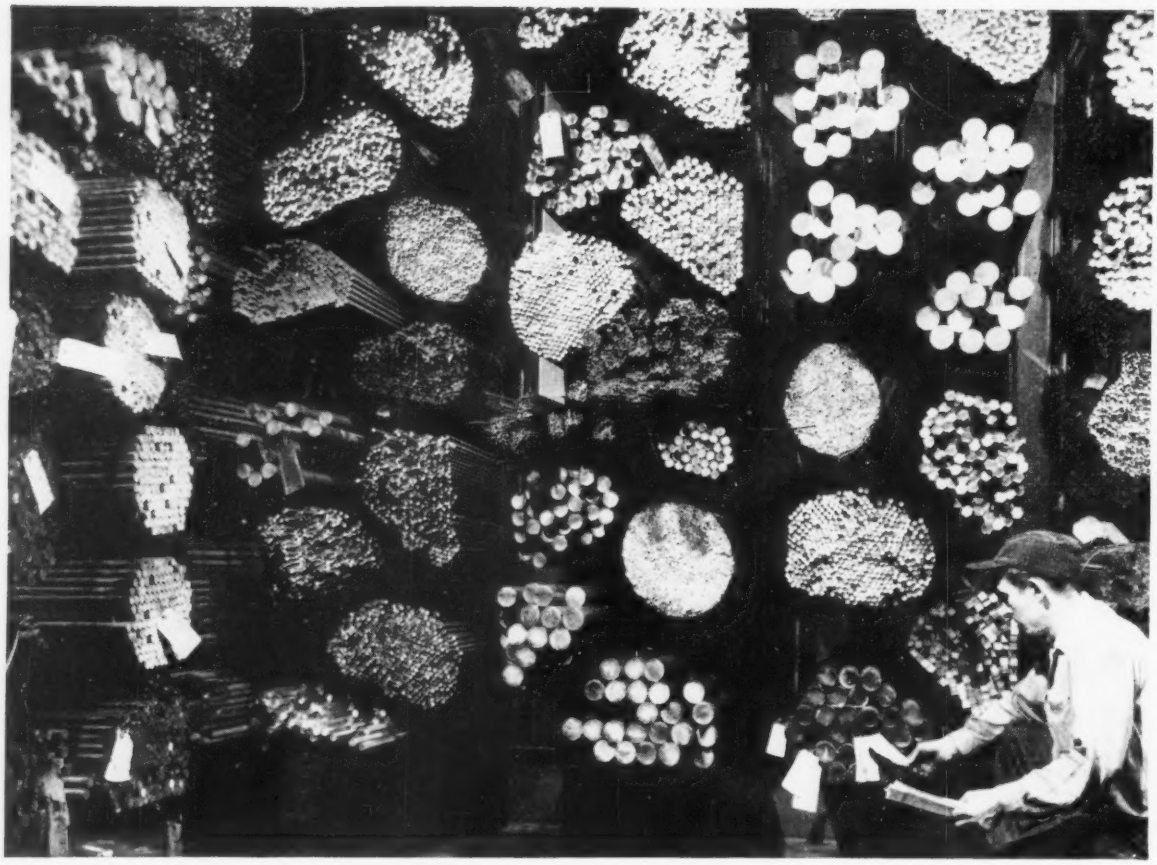
They want to know the real meaning of such things as insurance and pension plans, wages tied to the consumer price index, and Supplementary Unemployment Benefits.

People want to be in the know.

We think that management can go a long way toward erasing our artificial class distinctions, and getting everyone on the same team, if it will lay all the facts on the line—clearly, concisely, and regularly.

Irwin H. Such

EDITOR-IN-CHIEF



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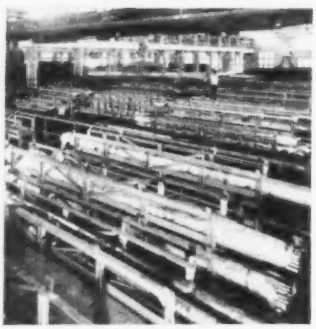

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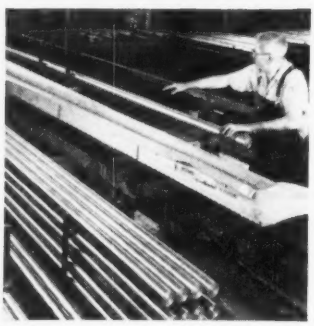

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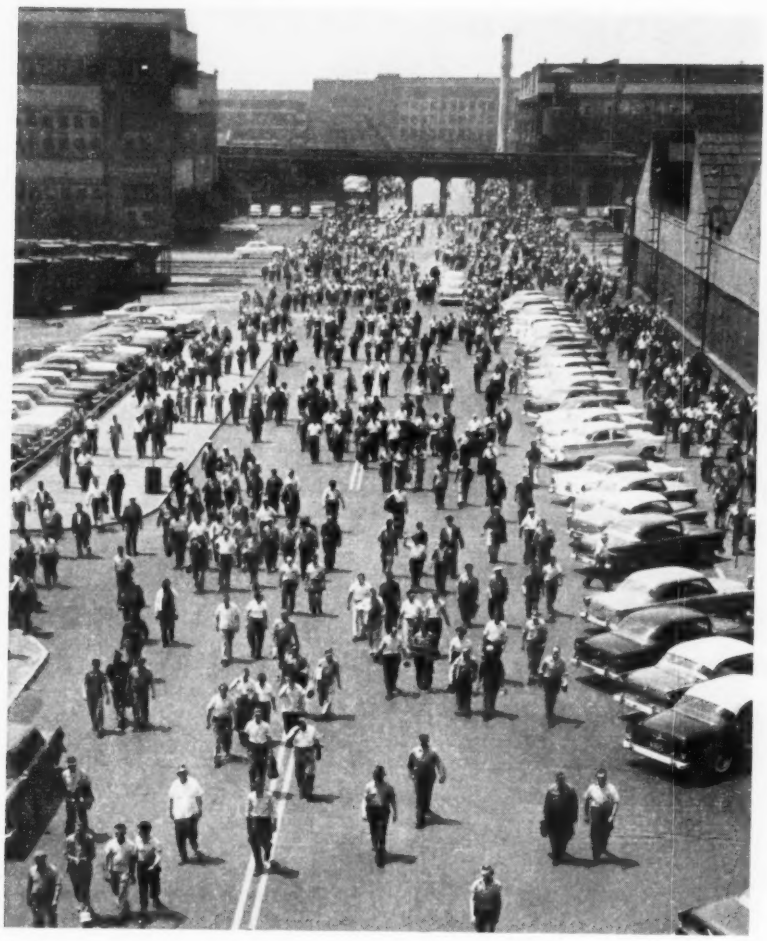


Labor Prospects Ominous As Steel Girds for 1959

BOTH labor and management in steel are already talking as if they'll have a strike next year.

The most important wage negotiations in 1959 will follow this timetable:

• **Signing in August?**—The United Steelworkers, representing about 500,000 members in basic steel, will start beating its drums louder in January or February—a prelude for the all-important meeting of the USW executive committee which will decide on demands and strategy. The wage policy committee will meet in late April amid the blare of publicity to endorse what the executive committee decided earlier. Bargaining will begin in May. The contract expires at midnight, June 30.

Judging from experience, you're safe in betting that no agreement will be reached by the deadline. But it doesn't mean there will be a strike immediately. An extension or two will probably be agreed upon. Thinking among steel company executives is that the contract won't be signed until August. Some say September.

• **Sources of Trouble?**—Steel executives are after a far more moderate settlement than the three-year pact signed in 1956. "We got pretty badly burned on that one," is the comment of one steel company labor relations man.

He and other managers have read the resolution passed at the last Steelworker convention calling for "substantial" wage increases in the next contract. They hear Steelworker President David McDonald making belligerent speeches. No wonder the outlook is ominous.

• **The Issues**—As usual, wages will be the central issue. Steelworkers will set 7 cents as the minimum they'll settle for. It's what autoworkers get next August. The $2-a-day pay boost won by soft coal miners, many of whom work for steel company subsidiaries, will also put the squeeze on management. Look for the steel union to ask that steel wages be "equalized" with coal rates. With the new boost, the miners earn about 30 cents more per hour than steelworkers. Steel companies can show that the coal settlement is exceptional, that the median increase in 1958 has been 8 cents an hour.

The steel industry is believed to be studying productivity trends to bolster its argument that wage gains should not exceed the improvement in productivity. And it will argue that productivity cannot be measured by manhours alone; capital investment must be taken into account. Steelmen are working with data that show productivity for all industries is not rising as rapidly as unions contend. They're coming up with a figure of about 3 per cent per year for the last nine years, somewhat lower than the Bureau of Labor Statistics' 3.9 per cent based on manhours alone.

The steel industry also wants to change the cost-of-living provision. That one has really hurt, costing 16 cents since it was first figured

Past Steel Labor Settlements

1956 Three-year contract which granted adjustments costing about 13-14 cents each year, plus cost-of-living provisions whose total cost through Jan. 1, 1959, will probably be 17 cents.

1955 Average wage rate increase of 15.2 cents per hour, consisting of 11.5-cent hike in minimum rate plus boost in job class increments of 0.5 cent, bringing differential to 6 cents.

1954 5 cents in direct wage hike across the board; 4 cents in increased contributions to insurance, to be split by company and worker; pension boost from $100 to $140 per month.

1953 8.5 cents in straight hourly wage boost; end of the north-south wage differential to come by July 1, 1954.

1952 Average wage rate increase of 16 cents per hour, consisting of 12.5-cent boost in minimum rate plus hike in job class increments of 0.5 cent; six holidays, better vacations, union security.

1950 Average wage rate increase of 16 cents per hour, consisting of 12.5-cent boost in minimum rate plus hike in job class increments of 0.5 cent.

1949 Noncontributory pension and contributory insurance plans.

for Jan. 1, 1957. It will probably go up another penny Jan. 1, 1959.

The union has sent letters to many of the steel companies asking for much information on job classes, changes, and related subjects. While that's a standard request before each negotiation, it is unusually detailed this time and has led some observers to expect union demands in that area.

• **Other Demands**—The steelworkers will also want more liberal Supplemental Unemployment Benefits. They'll want a boost in weekly payments and benefits extended from the present 26 weeks to 39. Health and welfare demands are also likely.

The companies will be cautious about the length of the pact. "I'm disenchanted with long term contracts," says one company's representative. A two-year deal is a possibility this time.

• **U. S. Steel's Negotiators** — Because of U. S. Steel Corp.'s role in the steel industry, its bargaining team is especially important. Its veteran negotiator, John Stephens, is in semiretirement. R. Conrad Cooper, the new executive vice president-personnel, will have over-all direction of the corporation's strategy. R. H. Larry, administration vice president, will probably handle face-to-face negotiations with the union.

Many other labor parleys come up in 1959. Here are some of the major ones of interest to metalworking:

The United Mine Workers negotiate with the hard coal industry in January. International Nickel Co. faces the United Steelworkers next month, too. Bell Aircraft Co. deals with the United Auto Workers in March. Major rubber companies and the United Rubber Workers meet in April. Contracts with railroad operating and nonoperating unions expire next November.

Steel Output To Gain

AISI official thinks we'll turn out 100 million to 110 million net tons next year

THE UPTREND in iron and steel production will continue during 1959, predicts Max D. Howell, executive vice president, American Iron & Steel Institute. He pegs next year's output at 100 million to 110 million net tons for ingots and castings—barring unforeseen interruptions. Comparisons: About 85 million tons in 1958 and 117 million tons in record 1955.

Mr. Howell notes that output has come a long way up the recovery road in recent months. Monthly production was 55 per cent higher in November than it was in April, the low point.

Despite the 25 per cent drop in steel production this year (compared with 1957), the estimated average hourly payroll cost for wage earners increased about 10 per cent during the same period. Included in increased costs are fringe benefits, which are more than six times as high as they were in 1949.

The estimated 1958 payroll (wage and salary employees) of companies reporting to American Iron & Steel Institute is over $3.3 billion, vs. $3.8 billion in 1957, about a 13 per cent decline. Estimated average employment during 1958 is 522,000.

Record Steel Sheet Rolled

What is said to be the widest sheet (160 in.) of high strength steel ever produced has been pack rolled by Lukens Steel Co., Coatesville, Pa. It is used in solid fueled rocket motors. Advantages: 1. The number of weld seams is reduced, lessening premature motor failure. 2. It enables closer gage and crown tolerances for better weight control.

In pack rolling, layers of high strength material are placed between two steel cover plates, forming a sandwich. By welding all around the pack, the alloys are protected during the heating and rolling cycles. Decarburization and oxidation are controlled, creating a smooth sheet surface.

The process also allows crossrolling. The pack is sent through plate mill rolls lengthwise and sidewise.

How To Boost Efficiency Of Your Indirect Labor

THE PRODUCTIVITY of your indirect labor personnel probably does not exceed 60 per cent, say experts in the field of work measurement. But you can improve that figure plenty.

• **This Firm Did**—Jack & Heintz Inc., Cleveland producer of electric motors and aircraft parts, boosted the productivity of indirect labor to 115 per cent of standard—and greater gains are expected. The key: An incentive system. Personnel covered include maintenance oilers, tool crib and storeroom workers, inspectors, and packagers of replacement parts.

"We believe the productivity of those people averaged less than 65 per cent before we installed our incentive system," reports N. G. Zay, manager of industrial engineering for J&H.

• **And Benefited**—The success of the J&H program can be measured this way:

1. Cost per standard hour of inspection time was slashed 34 per cent; cost per inspected job was reduced 20 per cent. "A high level of quality has been maintained," reports Mr. Zay.

2. In the replacement part department, the work force was cut 43 per cent.

3. The central stores department (tool crib) realized manpower savings of 26 per cent. And floor space was trimmed 32 per cent—due to consolidation of cribs and elimination of overlapping functions (such as record keeping and material handling).

4. "Employee morale is much higher because indirect workers can reap higher earnings on the same incentive basis as their direct labor counterparts," notes Mr. Zay. Indication of employee acceptance of the plan: The earned incentive rate averages about 50 cents an hour.

• **Why Do It?**—J&H management knew that incentives would improve the performance of indirect labor. But to install incentives, you need standards. To set standards, you must measure job content. How do you do that for people like oilers and stockroom workers? Conventional time study was deemed impractical. The solution: A standard data approach. E. A. Cyrol & Co., Chicago management consultant, was asked to help get the program rolling.

• **How It Works** — Under the standard data approach, you don't have to break a job down into tiny elements. You time study the whole operation (see exhibit). And it's economical.

Worksheets were developed for timekeeping and reporting. The worker merely circles a number for each completed job. (For example, an oiler circles the number of each department he has serviced.) A form is provided on the bottom of the sheet for listing of incompleted jobs. The accounting department finds tabulation is easy.

• **More To Come**—Jack & Heintz is so satisfied that it intends to extend the plan to other indirect labor people, including setup men. "Our aim is to give the maximum number of employees an opportunity to earn incentive pay," says Mr. Zay. "They want it."

• **Side Benefits**—As a result of the studies that preceded the incentive program, many methods improvements were made. Example: In the replacement part area, heat sealers were installed on all benches, the area was rearranged for more effective use of space, and wrapping paper is now purchased ready cut instead of in bulk rolls. "That eliminated an operation, standardized wrapping procedures, and slashed costs," Mr. Zay reports.

Such measurement also allows accurate forecasts of manpower needs.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Examples of Oiling Elements and Their Base Times

		Hour
Grease fittings using pneumatic equipment.	Per Fitting	0.30
Grease fittings using manual grease gun.	Per Fitting	0.14
Make ready to grease, using pneumatic grease equipment.	Per Mach. Occurrence	0.34
Prepare to move to new location, using pneumatic grease equipment.	Per Mach. Occurrence	0.33
Fill manual grease gun from drums on grease dolly.	Per Mach. Occurrence	0.14
Remove grease cup from machine for packing with grease.	Per Cup	0.25
Fill grease cup by hand.	Per Cup	0.21
Replace grease cup on machine.	Per Cup	0.27
Fill oil can from drum.	Per Mach. Occurrence	0.07
Get or return equipment from or into cupboard.	Per Occurrence	0.48
Remove guard or cover from machine.	Per Guard or Cover	0.28
Replace guard or cover on machine.	Per Guard or Cover	0.48
Return to oil drum or grease dolly to replenish supply.	Per Mach. Occurrence	0.03
Get or return grease dolly or oil drum dolly to or from storage.	Per Occurrence	0.19

FOREIGN OUTLOOK FOR 1959 . . . No. 3

Reds Spur All-Out Drive

China Doubles Steel

IN TEN YEARS, Red China may be a bigger threat to America and world peace than Russia is now. Such a dim prospect becomes clearer as China nears two targets: 1. Production of 10.7 million tons of steel this year. 2. Eventual overtaking of Great Britain as a world industrial power.

China's leaders have succeeded in prodding an agrarian-minded people to build industry at a feverish pace. Statistics show China is rapidly nearing its goal in steel output. The nation lags far behind the West in production of consumer goods. Emphasis in steel is on tubes, plates, and rails.

• **Closing the Gap**—China built its steel output from 5.4 million tons in 1957 to 7.2 million tons in first ten months of this year. In October, the total was 1.9 million tons—more than the prewar record for an entire year. Chinese steelmakers confidently expect to pass Great Britain soon. British plants will turn out about 21 million tons of steel this year.

Industrial output of China in first nine months of 1958 was 57 per cent higher than in the corresponding period of 1957, Communists claim. Between January and June of this year, they say, 990,000 new workers joined the nation's industrial labor force.

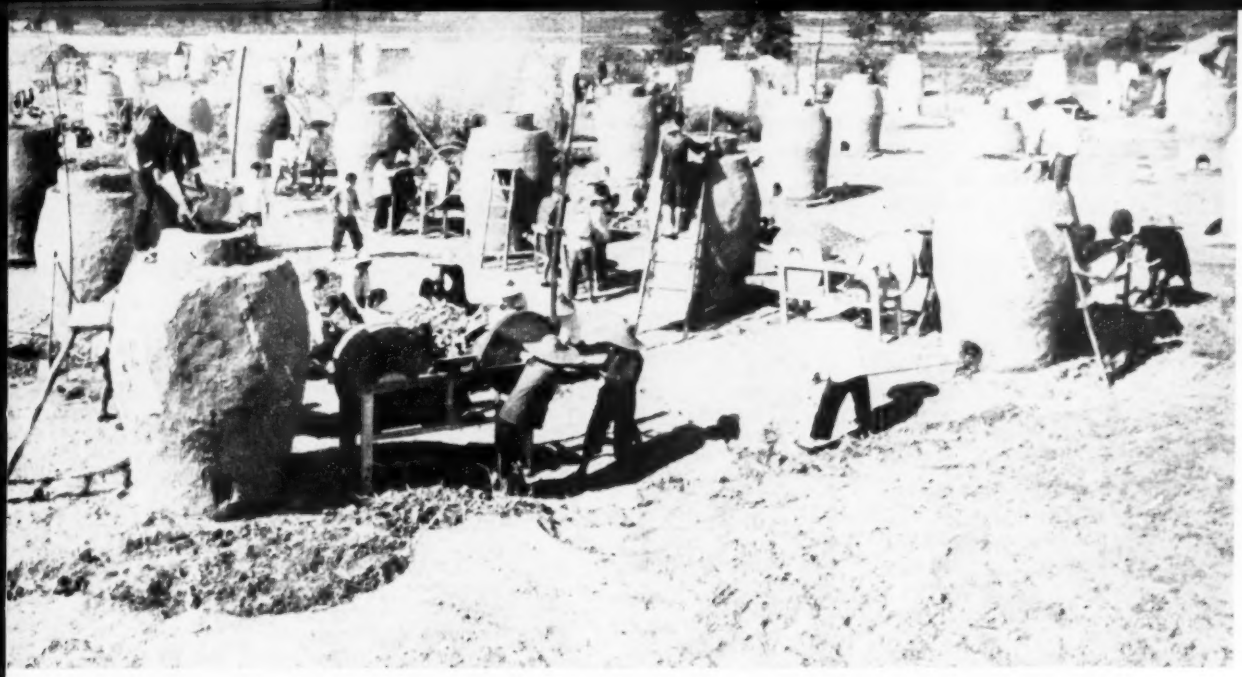
• **Homemade Steel**—Thousands of small blast furnaces contribute to China's advance in iron and steel. Western visitors report small, reverberatory furnaces made of bricks and earth crowded into side streets and vacant lots of cities. Built and operated by peasants, these blast furnaces make an estimated 30 per cent of China's pig iron.

Small furnaces fit well into China's economy. They are less highly mechanized and require less investment than large units, and they make abundant use of the nation's manpower. Industrial planners say building of a single blast furnace with annual capacity of 300,000 tons of pig iron takes three or four times as long as 100 small blast furnaces with the same total capacity. China's leaders can't afford to pause in their headlong rush to put together an industrial machine.

Estimates of the number of blast furnaces in China range from 300,000 to 700,000. Most have gone up within the last year. Over 1000 bessemer converters have been constructed this year, Chinese industrialists claim.

The Chinese admit that small units produce low quality material. Some observers say it's suitable only for primitive tools and agricultural implements. But training of technical personnel for China's large industrial centers goes on at the furnaces.

• **Major Plants Grow** — Leading steel plants are in for their share of expansion. Major producing points are at Anshan, in northeast China; at Wuhan, in central China; and



Although primitive, these blast furnaces on the outskirts of Hsinyang are turning out pig iron for Red China

To Catch Up with West

at Paotow, in Inner Mongolia.

Anshan hopes to turn out 4.5 million tons of steel this year. Russian experts are helping to open two new iron ore mines and are building six blast furnaces, two steel mills, eight rolling mills, and three plants to produce refractory materials. Four open hearth furnaces at Anshan have gone into operation this year.

When completed by 1960, the plant at Wuhan will have nine highly automatic open hearth furnaces. A blast furnace built with Russia's help turned out its first iron in mid-September. It has a daily output of 2500 tons.

Installation of the body of the No. 1 blast furnace at Paotow is underway, as are 12 other projects on the site. Wuhan and Paotow will each produce 1.5 million tons of steel annually when first phase of construction is completed in 1962.

China plans its largest side-blow acid bessemer converter plant at Hantan, Hopei province. It will have a capacity of 1.2 million tons of steel a year. Completion is scheduled in 1962.

• **Technology Advances**—When all of these projects are finished, the Chinese think their industry will equal top world standards. Their steelmakers aren't far behind Americans in technology. For example, they claim to have invented the world's first horizontal continuous casting machine at a Shanghai plant. The Chinese Academy of Sciences has produced a stainless steel with no nickel content. The East China Chemical Engineering Institute says it has discovered a method of making steel directly from iron ore, through the use of natural gas. It reportedly can turn iron ore into steel in 90 minutes.

Heavy machinery and farm equipment production is also on the rise. Output of farm tractors rose from zero to 20,000 between 1957 and 1958. Target for 1959 is 200,000 units.

Mining is expanding to keep pace with steel. Coal production increased from the Nationalist China record of 62 million to 130 million tons last year. The country's iron ore output will reach 200 million tons by 1960, 13 times that of 1957, the industry claims. China's iron ore and coal reserves are estimated in hundreds of billions of tons.

• **No Utopia Yet**—Against these accomplishments must be weighed China's weaknesses: Lack of consumer goods industries (such as auto production), low petroleum reserves, recurrent reports of riots, and the problem of building food supplies fast enough to keep up with population growth. (China may contain 1 billion people by 1980.)

If China's Communist rulers can keep this expanding population under their collective thumb until the nation reaches industrial maturity, you can expect to see that country rival or surpass Russia as a threat to the western world.

Russia Pushes Exports

DON'T WRITE OFF the Soviet Union as a strong competitor in world markets. It is peering at outlets for goods in South America and Western Europe as well as those in

the underdeveloped nations in Africa and Asia.

In a couple of decades, the Soviet Union has changed from a largely agricultural nation to one that today is second only to the U. S. in economic strength.

• **How Russia Operates**—While the Soviet Union's gross national product is only one-third as large as ours, and its industrial capacity is less than half as big, it can direct its resources wherever it pleases. Consequently, the Soviet leaders are going all out in building an industrial capacity to match ours. With a controlled economy, they do not need to satisfy demands for consumer products at home before they pursue their political objectives abroad via the economic route. (Russia boasts about selling motor vehicles in 42 foreign countries.)

The USSR can buy surpluses from underdeveloped countries at prices above world market levels. It can sell materials, equipment, and manufactured goods at bargain counter prices whenever it pleases. (It has created havoc in western markets by dumping aluminum, tin, and platinum. It is selling machine tools at prices one-third to one-half under those of U. S. builders.)

• **Trade Moves Up**—In comparable prices, the Soviets report their foreign trade in 1957 was 520 per cent of the 1938 level. Exports valued at 17.5 billion rubles ($4.4 billion at the official rate of 25 cents per ruble) included 13.2 billion to satellite countries and 4.3 billion to capitalist states. Of 15.8 billion rubles in imports, 11.3 billion were from the satellites and 4.5 billion from the West.

Exports to both Communist and non-Communist countries were 22 per cent higher than in 1956. Significantly, imports from capitalist countries rose 27 per cent, compared with only 3 per cent from Communist states. That is interpreted this way: The Soviets asked the Chinese to pay off with export surpluses of raw materials for industrial equipment, including facilities for 211 complete plants.

Russia exported 94,000 net tons of aluminum last year, of which 32,000 tons went to the West. Tin exports were 20,000 tons, of which 12,000 tons were shipped to western countries. Russia also exported substantial tonnages of copper, zinc, and steel. Some of that steel went to Latin America.

• **Exports Consumer Products**—While figures are not available for 1958, there is every indication that Russia is pursuing a policy of exporting products that could be consumed at home. Russia's aim is not only economic aggression. It is seeking to obtain dollars and sterling for equipment purchases abroad. For instance, the Soviets have initiated a 100 billion ruble crash program for expansion of their chemical industry under the new seven-year plan which starts in 1959. They say they can build their own equipment; but they can expedite the program by buying from the U. S., West Germany, and Great Britain.

This seven-year program, while exceedingly ambitious, shows that the Soviets are unable to expand their industry quite as fast as anticipated. Gross industrial production is scheduled to rise 8.6 per cent a year, a jump of 78 per cent for the seven years. Under the fifth five-year plan (1951-55), the Soviets claimed that industrial output rose at the rate of 13 per cent a year. In the sixth five-year plan (1956-60), which has been scrapped, they envisaged an annual increase of 10.5 per cent.

Russian Production Plans Show:

	1955
Coal (million net tons)	430.0
Coke " " "	48.0
Petroleum " " "	88.1
Electric Power (billion kw-hr)	170.0
Natural Gas (billion cubic meters)	10.3
Iron Ore (million net tons)	79.1
Pig Iron " " "	36.6
Steel Ingots " " "	49.8
Rolled Products " " "	38.8
Metal Cutting Machine Tools (thousand units)	117
Passenger Cars & Trucks " "	445
Farm Tractors " "	163
Electric Locomotives (units)	194
Diesel Locomotives (units)	134
Freight Cars (units)	34,400
Radio & TV Sets (units)	4,024,000
Household Refrigerators (units)	151,400

*Includes both electric and diesel locomotives.

Accent on Industry, Not People

Output			Goal
1956	1957	1958	1965
472.0	509.0	544.0	665-680
51.4	53.5	54.4	— — —
92.2	108.0	122.3	260-270
192.0	210.0	212.4	500-520
13.0	20.2	26.5	150
85.8	92.6	96.9	170-180
39.4	40.7	42.7	75-80
53.5	56.1	59.8	95-100
41.6	44.2	46.8	75-80
121	130	140	190-200
465	495	512	750-850
184	204	220	— — —
216	270	350	2550-2700*
161	400	658	— — —
40,000	38,300	40,665	— — —
4,300,000	4,300,000	4,815,000	— — —
224,000	309,000	350,000	— — —

• **Steel Up**—Of course, as the industrial base grows, percentage increases are more difficult to obtain. In absolute figures, the Soviet Union is making tremendous progress as demonstrated by its steel industry. Back in 1930, when the first five-year plan was launched, the Soviets could make only 6.4 million net tons of steel. This year, they will make almost 60 million tons, or nearly ten times as much, despite the fact many plants in the Ukraine were blitzed by the Germans in World War II.

Under the sixth five-year plan, the Soviets were shooting for 75 million net tons of steel by 1960. That goal was cut to 71 million, but they still are adding 11 million tons in two years. The seven-year plan calls for 95 million to 100 million tons by 1965. The tentative figure for 1975 is 125 million tons.

When our current round of expansion is completed in 1959, the U. S. will have 147.5 million tons of steelmaking capacity. So the Soviets will not catch up for awhile, but they are narrowing the gap.

• **Distribution Austere**—In comparing the economies, it should be remembered that the Soviets regulate distribution of materials and finished products with wartime austerity. Nearly 80 per cent of Russian steel goes into structural shapes, bars, and heavy, flat-rolled products for industrial buildings, bridges, powerplants, railroad locomotives and cars, industrial equipment, and military hard goods.

Relatively little steel goes into housing or consumer goods. Apartments up to ten stories high are being built of solid masonry or assembled from precast concrete sections, including stairs and door and window frames.

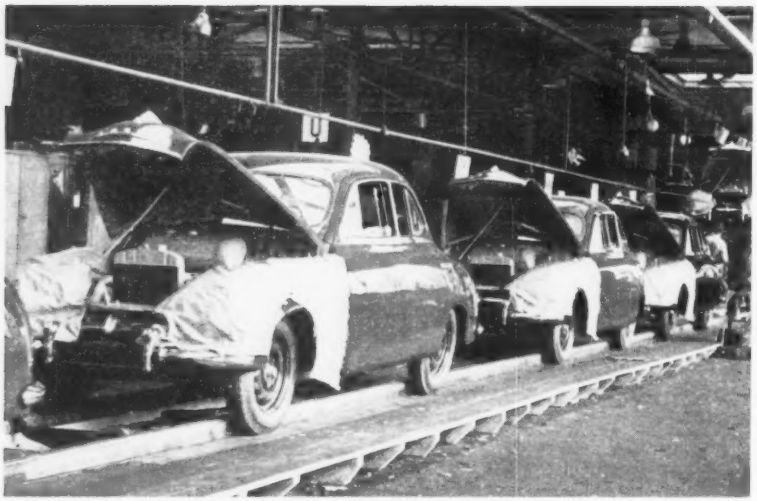
This year, the Soviets will make 122,000 automobiles, considerably less than we make in a single week. Soviet refrigerator production this year will be about 360,000 units, the amount we make in a month and a half. Steel is not "wasted" on such frivolous things as lawn mowers or beer cans.

• **Offers Empty Promises**—Under the seven-year plan, Nikita Khrushchev has promised the people a better standard of living—a promise that he does not intend to keep, except in the soft goods category. The emphasis will continue on more plant and equipment, the construction of oil and gas lines to shift the fuel balance away from solid fuels, the construction of electric powerplants, the accelerated expansion and modernization of the railroad system, and increased agricultural production.

New industrial complexes based on steel are planned in Central Siberia. Unit machine tool production will be increased from 140,000 in 1958 to 190,000-200,000 in 1965. Included will be construction of 1400 automated lines for the metalworking industry in the seven-year period.

• **More Power**—Electric power output will be increased two and a half times. Fifty-five hundred miles of new railroad lines will be built and 5000 miles of existing lines will be double tracked. Five-sixths of all rail traffic will be handled by diesel or electric locomotives by 1965. The chemical industry will double production of ammonia, caustic soda, soda ash, and sulfuric acid. It also expects to increase production of synthetic rubber two and a half times.

As their economy grows stronger, the Soviets intend to exploit what they term "tremendous export potentials." They say they are trading with 65 countries, including many western nations. Last year, machine tools and other equipment



This Skoda car is built in Czechoslovakia, the most industrialized of the satellites

made up 25 per cent of total exports, compared with only 5 per cent in 1940. The export list, they say, includes many items that "Americans, in their policy of discrimination, have designated as strategic."

East Europe Lags

YOU can't generalize on the progress of industrialization among Russia's satellites. Only a nation-by-nation analysis will give you the true picture.

• **East Germany**—This is probably the satellite country that's best known by U. S. businessmen. It is industrialized, but it suffers badly in comparison with its western counterpart.

Steel production in East Germany this year will be barely over 3 million tons (Russian statistics), vs. about 26 million tons in the western zone. East Germany's iron ore output will be about 2.4 million tons, compared with West Germany's 15 million tons. Some 2 million tons of pig iron will come out of East German furnaces, one-tenth of the free zone's production.

West Germany has an even bigger edge in the output of coal and electricity. East Germany mines about 3 million tons of coal annually and will produce about 34 billion kw-hr of electric power in 1958. The free zone will mine about 135 million tons of coal and produce 90 billion kw-hr of electricity. (No wonder the Russians would like to push the U. S. out of Germany.)

But don't discount East Germany. Using 1950 as a base of 100, its industrial index has climbed to 202, while West Germany's stands at 192.

More evidence of East Germany's increasing strength: In 1950, it turned out 8200 motor vehicles. This year the figure will be in excess of 50,000. (West Germany will produce 1.5 million in 1958.) This year East Germany will also turn out 1 million radios, about 55,000 television sets, and some 24,000 refrigerators.

East Germany can't be considered as a serious industrial competitor of the allied zone, but two things should not be overlooked: The rate of improvement in East Germany and the fact that the Russians will say nothing about the production of strategic materials in the sector.

One thing is certain about East Germany: The Reds don't like comparisons with the western zone. What they'll do to narrow the gap is open to debate. Their latest Berlin offensive is probably one step.

• **Czechoslovakia**—This little country (13 million people) is second only to the Soviet Union as a supplier of machinery and manufactured goods to the countries in the Russian sponsored Council for Economic Co-operation.

It will turn out about 6 million tons of steel this year, about 3 million tons of iron ore, and 3.6 million tons of pig iron—more than East Germany in each case.

During the next seven years, the Czech government plans to invest heavily to boost its industrial capacity to the No. 1 position in Central and Eastern Europe. Included will be two new steel plants, four power stations, three coal mines, a nitrogen fertilizer plant, a rubber factory, and oil refinery installations. Present facilities will be updated.

The country will specialize (as it always has) in heavy industrial production. Special emphasis will be placed on heavy machinery, tractors, locomotives, rolling stock, and general factory equipment.

Czechoslovakia outproduces East Germany in consumer goods. This year, it will turn out about 350,000 washing machines, 50,000 television sets, about 300,000 radios, and 60,000 refrigerators.

One sign of the country's edge over Red Germany: The Czechs have less railroad trackage but carry more freight.

• **Poland**—The Polish People's Republic specializes in the production of iron ore, pig iron, and steel. It will turn out about 16 million tons of iron ore this year—more than West Germany and almost as much as Great Britain. Its 1958 pig iron output will hit about 4 million tons, a figure that is bettered in the Communist world only by Russia and China. Steel production will reach about 6.3 million tons, third highest in the Red bloc. Next year should see further expansion into the production of basic materials.

• **Hungary**—The Hungarian People's Republic is slowly expanding all phases of industry.

Steel output this year will hit about 1.8 million tons, vs. 1.1 million in 1950. Iron ore output will be about 300,000 tons this year and next. Pig iron production should hit around 900,000 tons both this year and in 1959.

• **Bulgaria**—This nation's steel pro-

duction may reach 200,000 tons this year, and it won't go over that total next year. Consumer goods industries are nearly nonexistent. Cutting tool production has been steady since 1950 (about 400 per year). Don't look for much improvement in the Bulgarian People's Republic. There isn't much to improve on.

• **Rumania**—The Rumanian People's Republic is better off than Bulgaria—but not much. Its steel output won't exceed 1 million tons this year or next. Some 800 cutting tools are turned out annually.

• **Outlook** — Although Eastern Europe doesn't look like much on the surface, the Soviets are doing their best to speed things up, and they're succeeding in some areas (as in Czechoslovakia). The Russians are willing to pay for results.

Source for Red Roundup

STEEL obtained its information on Communist industrialization from these sources: China—R. Westgate, Auckland, New Zealand; Russia—Irwin H. Such, editor-in-chief; East Europe satellites — United Nations, various embassies.

An extra copy of this roundup is available until supply is exhausted. Write Editoral Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Exports Boost Volume

Soaring export demand for oil, gas, and water well drilling machinery and equipment helped producers up their dollar value of shipments and services by 5.5 per cent between 1955 and 1957, the Commerce Department reports. Volume was $1097 million in 1955, $1157 million last year.

Exports rose 82.4 per cent in the two-year period, offsetting drops in domestic volume.

Although inventory depletion trimmed steel shipments to the industry this year, it's a booming market for the metal in nonrecession years. Commerce Department statistics show shipments of carbon and alloy steel oil country goods rose from 2.2 million tons in 1954 to 2.4 million tons in 1955 and 2.8 million tons in 1957.

Here Are Aluminum's Buyers

Building materials are the No. 1 customer for wrought products, Aluminum Association reports. Other leading buyers: Distributors and transportation

BUILDING PRODUCTS continue to hold first place in the usage of wrought aluminum products, reports the Aluminum Association, New York. Shipments to the building and construction field made up 22.5 per cent of total deliveries in the first half (see table).

The importance of building materials has grown steadily since the first half of 1956, when that industry took 19 per cent of wrought aluminum product shipments. Distributors and jobbers are the second largest consumers.

• **Permanent Mold Castings**—Nonmilitary motor vehicles remain the leading user of permanent mold castings, taking 58 per cent of all reported shipments. Home appliances, home furnishings, and equipment are the second leading consumer, taking 13 per cent of shipments.

• **Sand Castings** — Leading customer for aluminum sand castings are makers of industrial and commercial machines, equipment, and tools. This industry takes 43 per cent of the castings. National defense applications take 24 per cent of shipments.

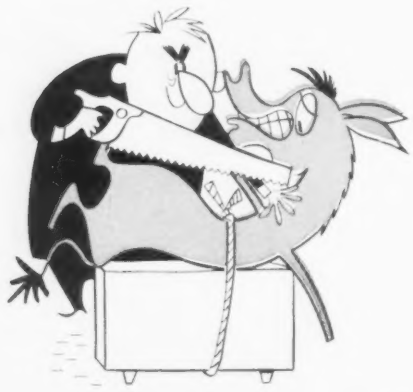
Whitehead Has New Name

Whitehead Metal Products Co. Inc., New York, changed its name to Whitehead Metals Inc. The firm distributes nickel, copper, aluminum, and stainless alloys. It does not fabricate metals.

Major Buyers of Wrought Aluminum Products

Consuming group	Percentage of total shipments purchased				
	First half 1958	Second half 1957	First half 1957	Second half 1956	First half 1956
Building materials	22.5	22.3	20.6	19.2	19.0
Distributors, jobbers	15.1	15.1	15.2	16.9	16.7
Transportation	13.9	15.8	18.3	18.6	17.4
Conversion	11.3	9.4	8.4	8.9	9.7
Electrical	10.3	10.2	8.9	8.2	7.8
Consumer durables	9.9	9.1	10.5	10.3	13.0
Containers, packaging	7.7	8.3	6.5	6.7	4.4
Nonelectrical machinery, equipment	4.0	4.0	5.5	4.7	6.2
Exports	1.3	1.5	1.3	0.7	0.9
Military	0.6	0.8	0.9	1.0	1.0
All other and unidentified	3.4	3.5	3.9	4.8	3.9

Aluminum Association.



Will a Democratic Split Help Business?

BY THE Presidential election year (1960), political pundits predict a complete split between northern and southern Democrats over the civil rights issue.

Such a rift could have a lot of significance to metalworkers. Southern Democrats already tend to team up with conservative Republicans. A schism would drive even more over to this antispending group.

In 1958, the southerners opposed personal tax cuts, a small corporation tax cut, and reduced excise taxes on autos by ratios ranging from 2 to 1 to 4 to 1. They tried twice to kill aid to depressed areas (finally vetoed by Ike); they joined with conservative Republicans to beat school construction, and half of them joined with over 100 Republicans and 31 generally urban Democrats to kill S. 4036, the Seaton plan for mineral subsidization.

Southerners countered northern liberal trends to send aid to Communist countries and voted for cuts in military assistance funds to non-Communist countries. Many backed the Republicans in defeating the Kennedy-Ives labor reform bill because they thought it was too weak.

Upon examination, the southerners are consistent in only one major area: They generally want to spend less federal money. No doubt, Sen. Harry Byrd (D., Va.), is their boss.

So if northern and southern Democrats split over civil rights, you can look for an increase in the number of congressmen who favor cutbacks in spending. The development would have an important bearing on mineral subsidies, defense spending, excise tax cuts, the federal highway program, and a host of other areas where business wants more spending, not less.

Higher Interest Rates Ahead

William McC. Martin Jr., chairman, Federal Reserve System, warned last week of inflationary tendencies in the recovery. Describing the Federal's monetary controls as "leaning against the wind whenever it is clear which way the wind is blowing," he touched on unemployment: "The better way to get these people back to work is to concentrate on fundamentals that permit the forces of the market to operate." Looking ahead, he added: "If business conditions continue to operate, it is normal to expect interest rates to rise."

Mr. Martin's words can be interpreted in only one way: The Federal is prepared to move quickly to dry up credit, if the recovery shows any signs of turning to boom proportions next year.

New Cabinet Post?

In what some regard as the first step toward the creation of a cabinet post for science, the National Academy of Sciences has appointed a committee (with the approval of Commerce Secretary Lewis Strauss) to "study the scientific programs" of the Commerce Department. Involved are: Bureau of Public Roads, Maritime Administration, Patent Office, Weather Bureau, Coast & Geodetic Survey, National Bureau of Standards, and Office of Technical Services.

A report from the committee, which includes top research personnel from industry, is due about June 1. NAS is a private group of scientists which advises the government on all matters of scientific or technical interest.

Several bills are expected to be introduced in the next session to set up a secretary of science to oversee all of Uncle Sam's science agencies. Some scientists oppose the move as "too centralized," but there is plenty of talk on Capitol Hill that the science agencies of the government lack co-ordination. A report from NAS recommending a cabinet post is a fair bet.

Renegotiation Refunds Drop

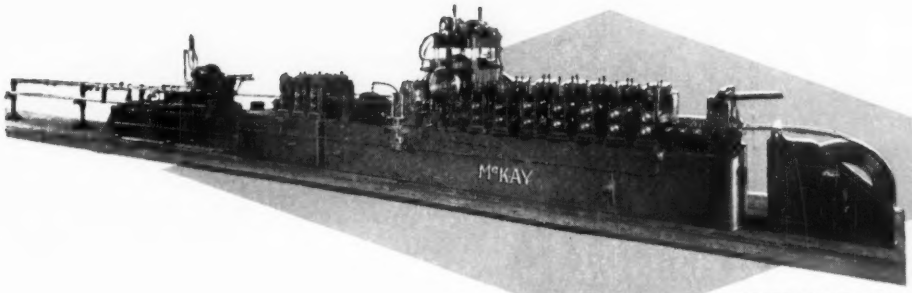
The Renegotiation Board reports it ordered U. S. industry to refund $113 million in profits to Uncle Sam in fiscal 1958. Comparisons: Refunds came to $151 million in fiscal 1957, $153 million in fiscal 1956, and $167 million in fiscal 1955. The drop represents the cleaning up of the board's case load from the Korean War.

Voluntary refunds and price reductions gained Uncle Sam another $176 million in fiscal 1958, vs. $303 million in fiscal 1957. (All refund figures are less tax credits.)

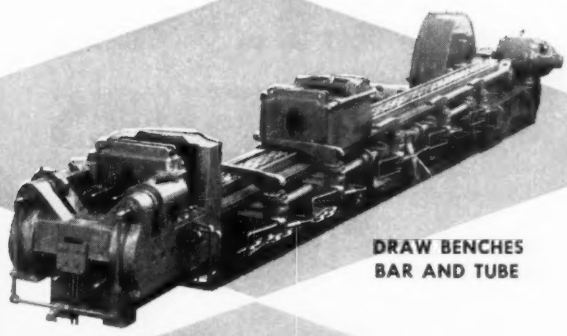
Once again the aircraft industry provided the bulk of cases in which the board issued unilateral orders to return profits.

Capitol Notes

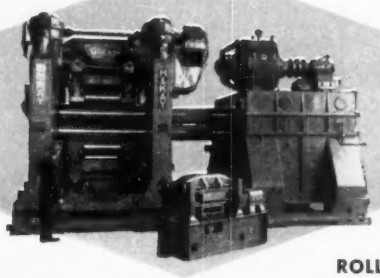
U. S. firms in Cuba must now pay ransom to Castro, as well as taxes to Batista, quips a Washington source. Until there is a winner, the companies will have to continue the practice . . . The Army, despite publicity to the contrary, is unhappy over Ike's decision to let NASA (our space agency) use Huntsville . . . An international agreement on lead and zinc is looked upon with favor by more observers here every day.



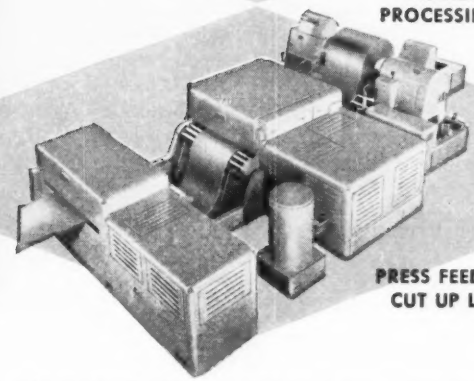
TUBE MILLS AND
FORMING MACHINES



DRAW BENCHES
BAR AND TUBE



ROLLER LEVELERS,
PROCESSING MACHINES



PRESS FEED AND
CUT UP LINES

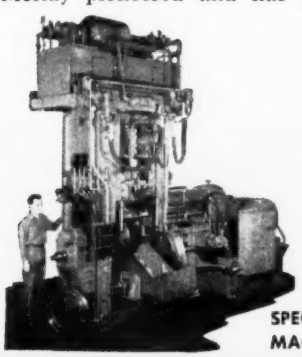
Metal working Automation in action...

If you're in the metal working business, you should be acquainted with McKay *automated* lines available for many metal working operations.

McKay pioneered and has played a leading role in the development of such equipment as that pictured on this page.

Basic McKay designs can be modified, or special machines developed to meet specific requirements.

THE McKAY MACHINE CO., YOUNGSTOWN, OHIO



SPECIAL
MACHINERY

104

Versatile ACIPCO SPUN TUBES

Stainless steel, carbon steel, alloy iron or special analyses—versatile ACIPCO tubes are "custom-spun" to the exact physical, chemical and metallurgical specifications required by design, manufacturing and end-use conditions.

Because they are centrifugally spun, the metal grain structure of ACIPCO tubes is dense, non-directional and porosity-free. This *superior* grain structure not only makes ACIPCO tubes easier to machine to close tolerances, but also results in greater strength and durability. In addition, the inherent dimensional stability and concentricity of ACIPCO tubes make dynamic balance easier to attain in finished products.

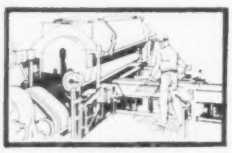
ACIPCO's complete, integrated facilities for casting, heat-treating, machining, fabricating and testing offer the additional advantages of "one source—from start to finish" service.

Call or write today for information about ACIPCO tube applications in your field, or for expert technical assistance on your specific tubular metal problem.

SIZE RANGE: Lengths up to 410" have been produced to meet modern machinery requirements. OD's from 2.25" to 50"; wall thicknesses from .25" to 4".

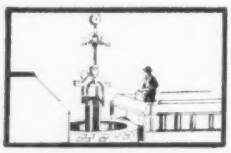
ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special analyses.

FINISHED: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.



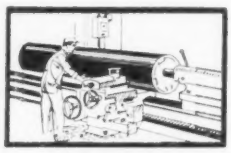
SPINNING

ACIPCO tubes are centrifugally spun to exact physical and metallurgical specifications. Thus, the exact size and metal analysis your process or project requires is assured.



HEAT TREATING

Modern equipment for uniform, controlled heat treating and quenching is an ACIPCO advantage for users of steel tubes where specific physical, mechanical and other metal properties are required.



MACHINING

ACIPCO'S machine shop, one of the South's most completely equipped, performs a full range of machine shop operations including turning, boring, drilling, facing, grinding, metallizing, polishing and honing.

FABRICATION

Complete, integrated facilities for machining, welding, finishing and heat treating of tubular parts save time and expense for ACIPCO customers.

TECHNICAL ASSISTANCE

A staff of highly trained engineers, metallurgists, chemists, and craftsmen is available to designers and manufacturers who specify ACIPCO spun tubes.

Special Products Division

AMERICAN CAST IRON PIPE CO.

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New Lines Aid Arkansas Gas Utility

A WHOPPING diversification program has been profitable for Arkansas Louisiana Gas Co. With its present subsidiary lineup, earnings were boosted 32 per cent in the last year; and 58 per cent of earnings came from nonutility origins.

In mid-1957, the gas utility, which serves Arkansas, Louisiana, and Texas, decided to provide new jobs and industries for its system. Since then, eight subsidiaries or divisions have been formed or acquired. Headquarters are in Shreveport, La., and Little Rock, Ark.

The company has progressed partly by taking steps to revive interest in nonallied products from another era, such as gaslights and horse-drawn passenger vehicles. More modern interests include air conditioning, pipelines, cement, chemicals, and a finance company.

• **Income Rises**—This jumping of product fences may sound strange for a utility, but W. R. Stephens, president and chairman, points out its dollar value. Consolidated net income for the 12 months which ended Sept. 30, 1958, amounted to $2.36 per share, compared with $1.78 the year before. Of the 1958 figure, $1.36 was from other than utility accounts.

The sharp rise in revenues stems mostly from the first full year of operation of Arkla Air Conditioning Corp., a wholly owned subsidiary which makes central air conditioning and heating units fueled with natural gas. Arkla was organized in the fall of 1957 to acquire and operate the former air conditioning division of Servel Inc., Evansville, Ind. The purchase price was $3.7 million.

• **Good Start** — During the 12 months which ended last Oct. 1, Arkla sold some 7500 air conditioners, more than triple the 2400 units sold by Servel in its last year of operation. Sales of 12,000 to 14,000 are projected for an equivalent period in 1959.

Arkla's biggest markets are in the South, Southwest, and Central South, although the units are sold in every section of the country where gas is used. Servel had a similar geographic distribution—Arkla simply boosted volume and expanded into new markets with intensified sales promotion. The parent utility, Arkla's largest customer, installed or sold for future delivery 1666 units in the 12 months preceding October, 1958, a sixfold increase over the previous year.

• **Fixtures Boom**—A tremendous response to a promotion by the utility company launched Arkla in manufacturing and selling outdoor gaslighting fixtures. Gaslighting had served many parts of the world from 1792 through the decade of its heyday, the 1870s. The Wizard of Menlo Park, Thomas A. Edison, developed the first incandescent lamp in 1879 and electric lamps soon replaced gas in the field of illumination. The gaslighting comeback started a year ago when President Stephens tried promoting it in the company's three-state system. Fixture orders poured in so fast that the supplier could not meet the demand. So the company decided to manufacture the fixtures at its Evansville air conditioning plant.

Since beginning production in February, 1958, Arkla has entered full scale output of four fixture models and now ranks as the nation's largest producer of the "new-old" lighting units. Sales estimates for this year are set conservatively at about 90,000 units, about half the total market. The company anticipates a better year in 1959.

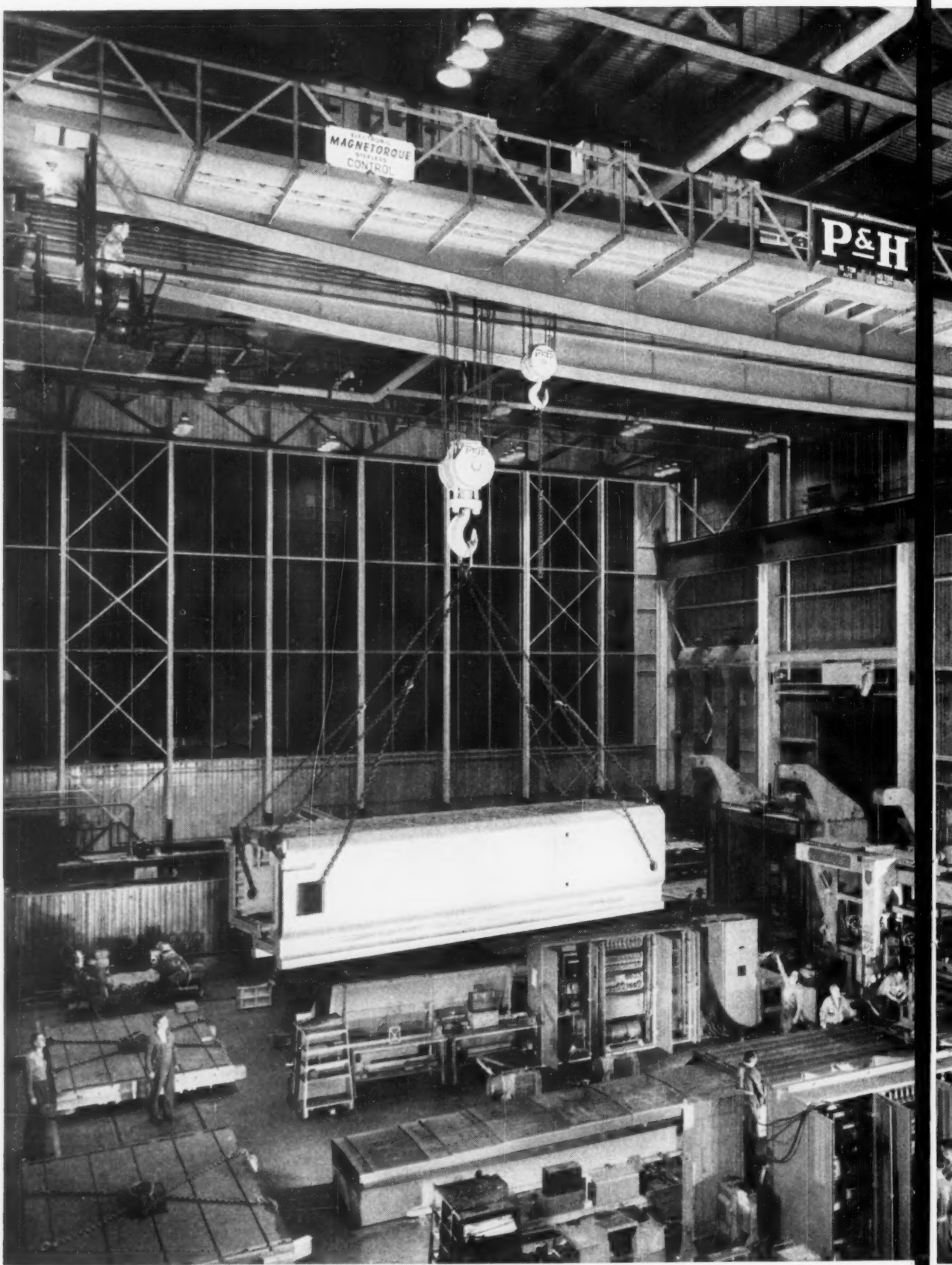
• **Along Came Dobbin**—On Nov. 8, Arkla Air Conditioning announced the acquisition of the buggy manufacturing division of the historic Huntingburg Wagon Works, Huntingburg, Ind. The division specializes in reproductions of America's early horse-drawn passenger vehicles. It produces buggies, surreys, sulkies, runabouts, pony and horse carts. Besides continuing operations at Huntingburg, an additional plant will be built soon near the utility's Emmet, Ark., compressor station.

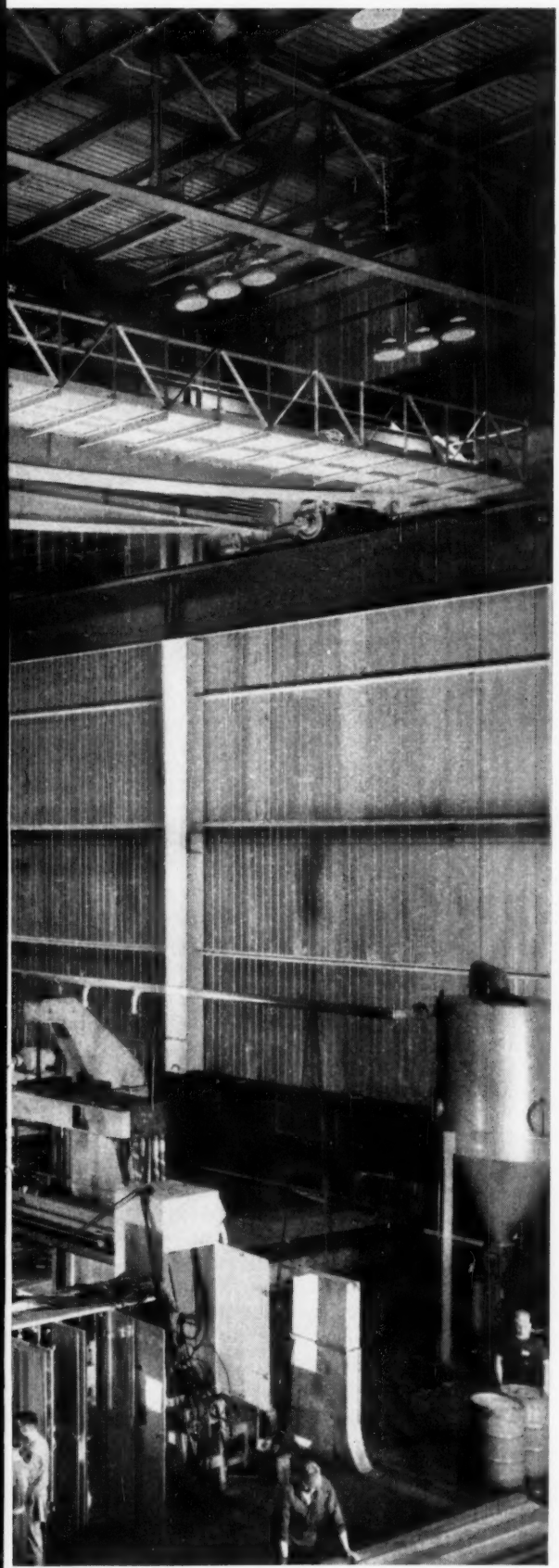
On Nov. 12, just four days after going into the buggy business, the parent company announced another purchase in Indiana. Reynolds Gas Regulator Co., Anderson, Ind., was obtained for $1 million. The Anderson factory will also continue operations, but within a year, a new plant (producing the same products) will be established in Arkansas.

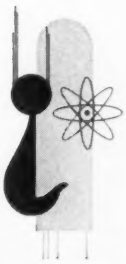
• **Owns Other Companies**—Besides Reynolds Gas Regulator, Arkla, and its Huntingburg Buggy Div., Arkansas Louisiana Gas has a pipeline construction company, a pipeline operating company, a cement plant, a chemical corporation, and a finance company.

Arkansas Louisiana Chemical Corp. is engaged in a $3 million expansion of an extraction plant at Magnolia, Ark. The new facilities, to be completed in the summer of 1959, are for extracting ethane and other liquids from natural gas. Last summer, the subsidiary leased part of the Pine Bluff (Ark.) Arsenal from the U. S. Army for the production of chlorine and caustic soda. These chemicals have many applications including usage in papermaking, oil refining, and the manufacture of aluminum and soap.

Arkansas Cement Corp. is completing a new cement plant in Foreman, Ark., with operations scheduled to start this month.


MAGNETORQUE
CONTROL
P&H





It's the CONTROL that determines whether your crane is modern!

...and P&H Electronic "Stepless" Control is the newest development in overhead crane controls. It's a remarkable crane control that provides smoother operation and more precise speed regulation. Operators can select exactly the *right* speed for any lifting and transporting movement, without being limited to "fixed" speeds.

You get a maintenance bonus in P&H Electronic Control, too. It's far simpler than previous crane controls, with fewer wearing parts to replace... or keep in inventory! The same control unit fits any size crane, and can be applied to modernize A-C cranes of *any* make.

You cannot afford to pass up this major improvement without a careful look. Be sure that P&H Electronic "Stepless" Control is included in your next crane inquiry. Dept. 125E, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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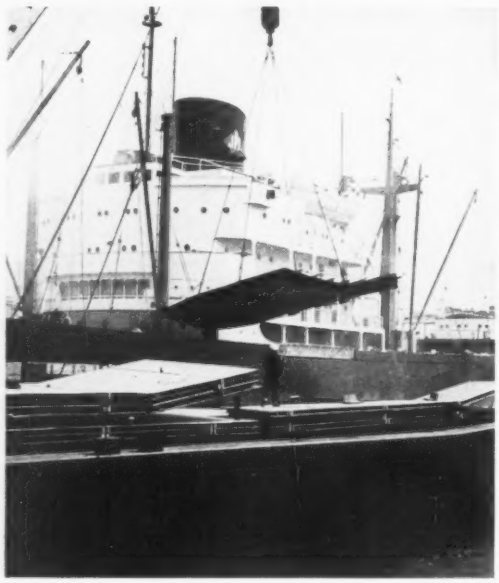
45.9% of Metalworking Plants Produce for Export



STEEL asked 7500 plant managers their outlook for dollar volume of exports in 1959 vs. 1958 . . .

36.1% Expect an increase
11.9% Expect a decrease
52.0% Expect no change

Increases Expected by Major Industry Groups:

Primary metals	1.1%
Fabricated metal products	1.7%
Machinery (except electrical)	3.3%
Electrical machinery	0.3%
Transportation	0.2%
Instruments, related products	3.3%
Other groups	0.6%

By Size of Plant:

Plants employing 20-99	1.8%
Plants employing 100-499	2.0%
Plants employing 500 or more	2.1%

Metalworkers To Export 1.9% More

IN NEW DELHI, India, the natives are flocking to three domelike structures where they see model American shops demonstrating ultrasonic machining, investment casting, metal spinning, and other modern metalworking techniques.

In the Middle East, bookkeeping machines that speak mathematical Arabic are boosting export sales for National Cash Register Co., Dayton, Ohio (which sells nearly 40 per cent of its output abroad).

In Sweden, housewives can buy one American appliance for less than its U. S. list price.

These are examples of the steps U. S. metalworkers are taking to halt the erosion of export sales. American industry is learning that it can't look upon foreign markets merely as a crutch when domestic sales lag. Foreign competition in export markets is inducing them to reinforce their attack or lose the battle.

That point is being driven home forcefully this year: Export sales won't match the gains made during the 1954-57 period. And metalworking anticipates a dollar volume increase of only 1.9 per cent next year (vs. about 9 per cent in 1957 and nearly 22 per cent in 1956).

• **Stung Worst**—Producers of iron and steel mill products are especially hard hit. During the first six months of this year, they shipped 1.85 million net tons of their products, vs. 3.49 million in the like '57 period. Dollar volume slipped 44 per cent. Foreign sales of nonferrous metals and ferroalloys dropped 45 per cent. Primary metal producers told STEEL their 1959 export sales would be only 1.1 per cent better than 1958's (see table above). But imports of those products are mounting rapidly (see STEEL, Oct. 27, p. 35). The situation signals a smaller share of the world market for U. S. manufacturers.

• **What To Do** — While foreign sales of many other items haven't hurt as much, they are feeling the pinch (see table on next page). Machine tool builders, who once sold 20 to 30 per cent of their output abroad, marketed only a little more than 10 per cent of their 1957 production outside the U. S. And they're watching foreign builders flood U. S. markets with tools at prices they can't hope to match. More important, the quality of the foreign made units is improving.

That signals a growing trend toward licensing foreign firms to make American-designed items, establishing subsidiaries abroad, and giving foreign distributors more marketing aid.

It's being done via trade fairs, price cutting, promotion of trademark identification (in some Arabic

Here's the Trend in Metalworking Exports

(Millions of dollars)

	1958 (1st 6 Mo.)	1957	1956	1955	1954
Passenger autos	168	298	333	381	301
Trucks & buses	193	433	440	342	333
Auto parts & accessories	315	573	584	511	402
Machine tools, metalworking machinery	192	309	237	206	210
Construction & mining machinery	425	881	795	535	448
Other industrial machinery	757	1190	1115	884	807
Iron & steel mill products	345	1377	1074	815	516
Electrical machinery & apparatus	444	803	747	639	599
Metal manufactures	280	516	469	397	341
Nonferrous metals & ferroalloys	166	447	415	317	305
Tractors, parts & accessories	205	275	291	286	278
Agricultural machinery & implements	82	132	126	123	126
Totals*	3572	7234	6626	5436	4666

*For products listed only.
Source: Department of Commerce.

dialects, "Parker" is the word for pen and "Gillette" means razor), designing products for foreign markets, and extension of credit.

• **Pay Later**—Foreign manufacturers have long had the advantage of government financing of their sales. The Export-Import Bank is now helping some U. S. metalworkers compete. Several private finance companies offer aid, too—but usually at fairly hefty charges.

Now Continental Casualty Co. of Chicago's Inter-Credit Agency, New York, is helping cushion the credit risk by underwriting insurance on foreign "pay later" agreements. Nigel Morrison, the agency's vice president, lists these benefits: 1. Less risk. 2. Ability to discount. 3. The deal is financed at American credit rates which can "save as much as 14 per cent on the financing costs."

Established foreign buyers can get 90 days' credit from U. S. manufacturers pretty easily now. Some American firms are allowing their better foreign customers even longer terms. One midwestern firm gave a 180-day pay period to a South American distributor who wanted to stock up on Christmas items. An Ohio company frequently sells on a 12 to 18 month installment basis.

Borg-Warner International Corp., Chicago, which occasionally grants credit for a 90 day period, cautions that the same amount of credit investigation is needed for a foreign customer as for a new domestic buyer. A bank is usually involved, and there's a "tremendous amount" of paperwork.

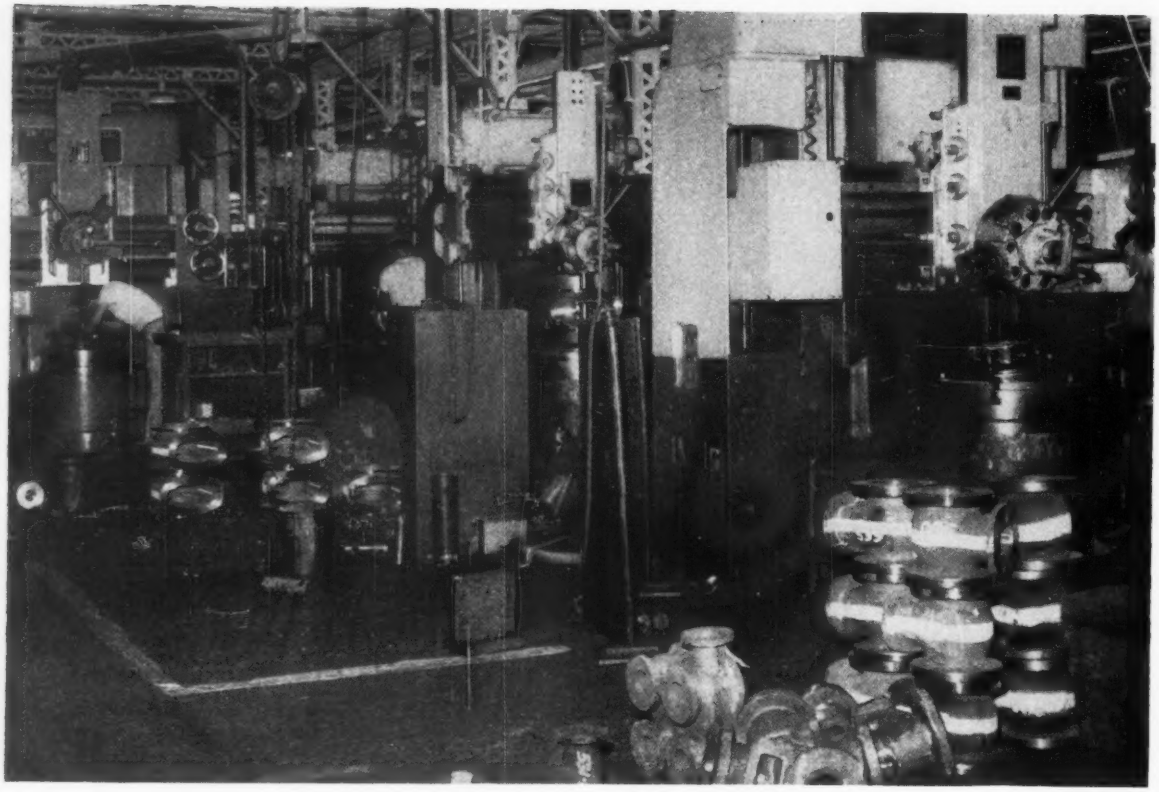
• **Bright Side**—BWI looks for its export sales to climb about 15 per cent next year, partially due to expanding product lines. Export items now range from appliances to cranes. Since B-W doesn't make some small appliances, they distribute other brands abroad.

V. E. Kuster, president, V. E. Kuster Co., Long Beach, Calif., producer of oil field instruments, expects a 5 to 15 per cent hike in his export business next year.

Edward P. Dobrin, president, Weksler Instruments Co., Freeport, N. Y., expects export sales to snap back next year. "We'll reach South American buyers by establishing a new distributor setup," he asserts. He believes superior design, immediate delivery and billing through local representatives who handle credit arrangements will speed up his firm's export business.

Charles Bruning Co. Inc., Mt. Prospect, Ill., is setting up its own export department after many years of working through an independent exporter. Reason: The firm, with only 3 to 4 per cent of total volume going abroad now, is aiming at a 15 to 25 per cent increase in 1959.

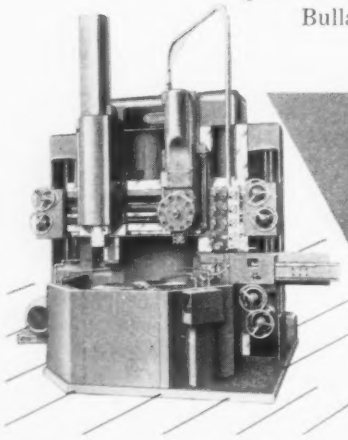
• **Stumbling Blocks** — Columbian Vise & Mfg. Co., Cleveland, is another firm that is allowing liberal credit abroad in an effort to salvage a diminishing market. Reports R. F. Swander, treasurer: "It's fast becoming almost impossible for a company such as ours (products include vises, clamps, and levels) to do any appreciable export business. We're more apt to be hurt by imports." The firm expects some decreases in shipments next year to one of its foreign markets, the Philippines, where tariffs will rise.



"they're GOOD machines"

A veteran of 39 years with the Newport News Shipbuilding and Drydock Company, Mr. L. G. Webb, Foreman, further said "a large volume of valve bodies, hubs or levers for hydraulic turbines and various other parts to be machined are handled most efficiently on our Bullard Model 75 Vertical Turret Lathes." Replacing Bullard V.T.L.'s of an earlier design, which gave them excellent performance, this company has a battery of ten Bullard Cut Masters, Model 75, ranging in size from 26" to 66".

BULLARD



The same dependable day-in and day-out cost cutting performance delivered by Bullard Cut Master V.T.L.'s, Model 75, can be applied to your machining work — have a Bullard Sales Engineer show you the many benefits of replacing your outdated equipment.

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The Ghost Walks on Steel

DETROIT is looking for a ghost that walks up and down sheets of cold-rolled steel it uses for stamping hoods and roofs. The ghost leaves tracks that look like thin parallel lines. Sometimes the lines show up as broad stripes; sometimes they look like a series of toothpicks. The most common ones look like shiny pencil lines.

Although the lines are of a slightly different texture and thickness than the rest of the steel, it's almost impossible to measure or locate them with a profilometer. Careful inspection will point up the lines prior to stamping, but too often they don't show up until the finished hoods and roofs have been painted. Because of the difference in texture, paint—particularly black—makes the line stand out clearly.

• **How Hectic?** — Reports vary widely as to just how serious the ghost lines are. Salesmen for the steel companies supplying the auto industry claim there's relatively little trouble, that rejects are no more now than they have been in any year. Metallurgists are more inclined to admit that there is a problem. Some of them say it's a serious one. The steel industry generally claims that automakers are at fault because they fail to use proper inspection techniques and don't prepare their steel surfaces properly prior to painting.

The car companies indicate that their troubles are much more serious than the mills would indicate. Says one stamping plant superintendent: "Our hood rejects are running over 25 per cent now. We had to turn back 2200 sheets one day last week." Another body division reports 40 per cent rejects on its hoods. Still another plant says that since its hardtop models are so low, roofs have become a serious problem. An inspector in this plant claims the company has rejected almost 30 per cent of its cold-rolled steel shipments in the last few months. Still another carbuilder has spent $32,000 revamping its paint system in one plant just to cover the ghost lines. Apparently, no mill is immune to the ghost lines although some seem to have a more serious problem than others.

• **Ghost Lines Defined**—In discussing the problem, one steel company metallurgist says: "Ghost lines have been in steel for years. The term seems to apply to a family of defects. Believe me, there's no more agreement on ghost lines than there is on virtue. It all depends on how you define it.

"There also seems to be a fairly simple reason why the problem has become more acute. A few years ago, hoods and roofs required fairly deep draws. This drawing tended to stretch out many of the ghost lines, so they weren't noticeable and could be covered by paint. Today's car styles call for flat panels that are wrap formed. This doesn't change the shape of the steel enough to pull out these lines. Higher production costs have forced the auto companies to drop a lot of hand finishing that used to work out some types of surface defects."

• **Why Does the Ghost Walk?**—Just as there are many definitions of ghost lines, there are many theories on what causes them. Scarfing marks or other mechanical imperfections aren't considered true ghost lines, say most metallurgists. Nor can they be labeled as oilcanning or orange peel. Most metallurgists are convinced they don't come from tramp elements in scrap charges, although a few of the steelmen think that some types are caused by slag inclusions that occur when the ingots are poured. Apparently, manganese ladle additions help correct this problem.

All those theories may account for some of the ghost lines, but at least two mills have been working on another approach which seems to get closer to the real cause. Cold-rolled sheets are aluminum killed to give them proper drawing qualities. A handful of aluminum pellets are tossed into the ingot molds before they're poured. Nobody is quite sure why, but sometimes the pellets don't melt completely. An aluminum oxide membrane forms around the partially melted pellet. The membrane usually keeps the pellet intact through soaking and pickling, but the membrane is ruptured during rolling operations, and an iron aluminide composition results. Through rolling it comes out as a series of different textured strips or ghost lines in the surface of the steel.

Steelmen still aren't quite sure that they have a solution to the problem, but the two mills which have been investigating it most closely say they've had fair success

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Haul out the crystal ball, see how many cars will be built in the U. S. from Jan. 1 through June 30, 1959, then enter STEEL's Beat-the-Experts contest. Just complete the entry blank and mail it in. But do it soon. Entries must be postmarked by midnight, Dec. 31. And with the Christmas rush, you could miss out on winning a scale model of General Motors' Firebird III. Ten "next-best-guessers" will get full color prints of a dream car rendered by George Walker, Ford's vice president and director of styling. About 1200 entries have been received, so pinpoint your estimate.

Beat-the-Experts Contest

I believe _____ automobiles will be produced in the U. S. during the first six months of 1959.

Mail this to:

Beat-the-Experts Editor STEEL Penton Bldg. Cleveland 13, Ohio

PRINT NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

by adding magnesium to the aluminum. The magnesium reacts violently enough to explode the membranes before they are completely formed. This permits the aluminum to dissolve completely. The method isn't new, but the difference apparently lies in how the magnesium and aluminum are shot into the steel. There has been some talk about dispersing alloying additives ultrasonically.

Offers New Transmission

Dana Corp., Toledo, Ohio, has announced an interesting semiautomatic transmission system which eliminates the clutch pedal on heavy duty trucks without cutting fuel economy. Called Presto-Matic, the unit will be introduced on diesel trucks built by Diamond T Motor Truck Co., Chicago.

Instead of a pedal, there is a touch button control on top of the gear shift lever that engages or disengages the clutch. Smooth engagement from a standing start is automatic due to a sensing mechanism that synchronizes clutch engagement with the speed of the engine. Diamond T officials describe its operation this way: It's like an expert driver using pedal control to effect full clutch engagement as the engine develops its maximum torque.

The clutch is automatically disengaged when the engine returns to idling speed. The combination of the two automatic actions permits a driver to inch along in heavy traffic without touching the control or shifting gears just as he would with a full automatic transmission.

Dana Corp. claims its Presto-Matic transmission system eliminates hydraulic pumping losses, retains fuel saving characteristics of a clutch type power train, provides effortless control, and leaves the selection of the proper gear in the hands of the driver.

No More Grease Jobs?

American Metal Products Co., Detroit, says it has developed a nonlubricated lifetime fabric bearing which will be used on at least one 1960 automobile. The Teflon bearings have the lowest coefficient of friction of any fiber and will give bearings up to ten times the life of metal-to-metal lubricated bearings, says Frederick C. Matthaei Jr., vice president, engineering and research.

The bearings will be used on steering and suspension systems initially, and Mr. Matthaei says they'll make for smoother riding and easier handling as well as saving on lubrication costs. Ultimately, he believes they can be used for most automotive bearing applications and will do away with the need for monthly lubrication.

U. S. Auto Output

Passenger Only	1958	1957
January	489,357	641,591
February	392,112	570,650
March	357,049	578,356
April	316,503	548,656
May	349,474	531,413
June	337,355	500,266
July	321,053	495,625
August	180,324	525,363
September	130,426	283,862
October	261,696	327,362
November	514,099	578,600
11 Mo. Total	3,649,448	5,581,744
December		534,714
Total		6,115,458

Week Ended	1958	1957
Nov. 15	117,688	141,904
Nov. 22	138,727	151,846
Nov. 29	123,088	114,795
Dec. 6	147,361	139,506
Dec. 13	139,562†	145,503
Dec. 20	137,000*	140,447

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Fewer Models in '59 Cars

After much adding and subtracting, Detroit decided there are 30 fewer models available in 1959 cars than in 1958 cars.

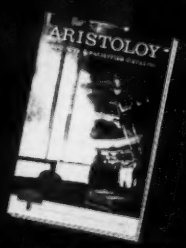
The lineups for the Big Three and Little Two show 237 models, vs. 267 in the '58 model year. Station wagons are the most popular. Some 52 models are offered this year, vs. 59 last year. There are 48 four door sedan models and 22 two door sedan models.

As might be expected, hardtops offer the biggest variety: You have a choice of 44 four door hardtops and 40 two door hardtops this year. Convertible models (31) are about equal to last year's (32).

On a company breakdown, Chrysler Corp. offers 83 models, GM 74, Ford Motor Co. 56. American Motors Corp. offers 17, choices and Studebaker-Packard Corp. has seven Lark models.

ARISTOLOY

Electric Furnace Steels



NEW PRODUCTS & FACILITIES CATALOG
Describes melting, rolling, thermal treating and finishing capacity of Copperweld's Aristoloy Steel Division. Complete product listing for Aristoloy carbon, alloy, stainless, leaded and nitriding steels. Send for your copy today.

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FURNISHED AS—Hot Rolled Blooms, Billets & Bars • Hot Rolled, Annealed & Heat Treated • Ground, Blooms & Billets • Bars—Hot Rolled; Turned; Turned, Ground & Polished; or Cold Drawn with or without Heat Treatment.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

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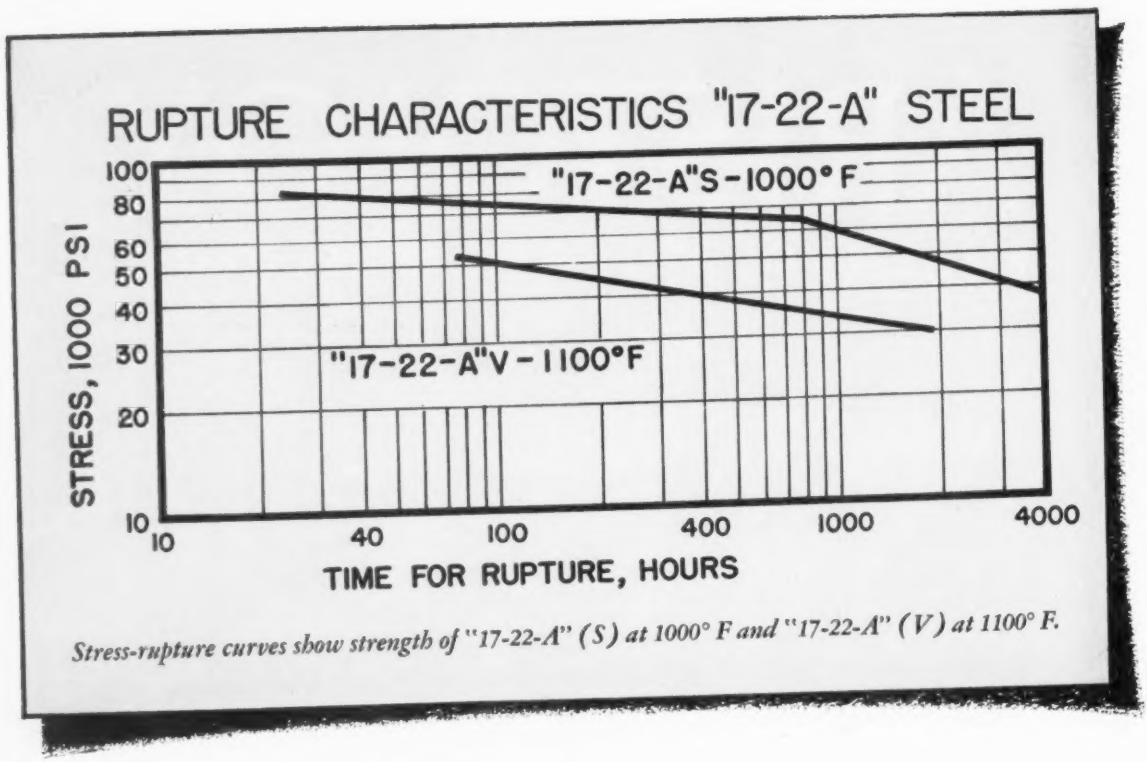

Stress-rupture curves show strength of "17-22-A" (S) at 1000° F and "17-22-A" (V) at 1100° F.

How to solve high temperature parts problems with low alloy steels

HERE'S how you can solve the problem of using expensive, high alloy steels for missile engine parts, airplane brakes, gas turbines or other units that must operate at high temperatures. You can use the Timken Company's *low* alloy "17-22-A"® steels. They contain less than 3% alloy. Yet they give *high* alloy performance—with maximum strength up to 1100° F. You save strategic alloys, cut your costs.

And that's not all you gain. Timken "17-22-A" steels have high resistance to heat checking and thermal cracking. They are readily workable up to 2300° F., are easily machined and welded. Maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

Get full details about "17-22-A"(S) steel, and its companion analysis, "17-22-A"(V), recommended for temperatures up to 1100° F. Send for Technical Bulletin 36B. And let our technical staff help you, as they've helped others, solve high temperature steel problems. Write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

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TRADE-MARK REG. U.S. PAT. OFF.

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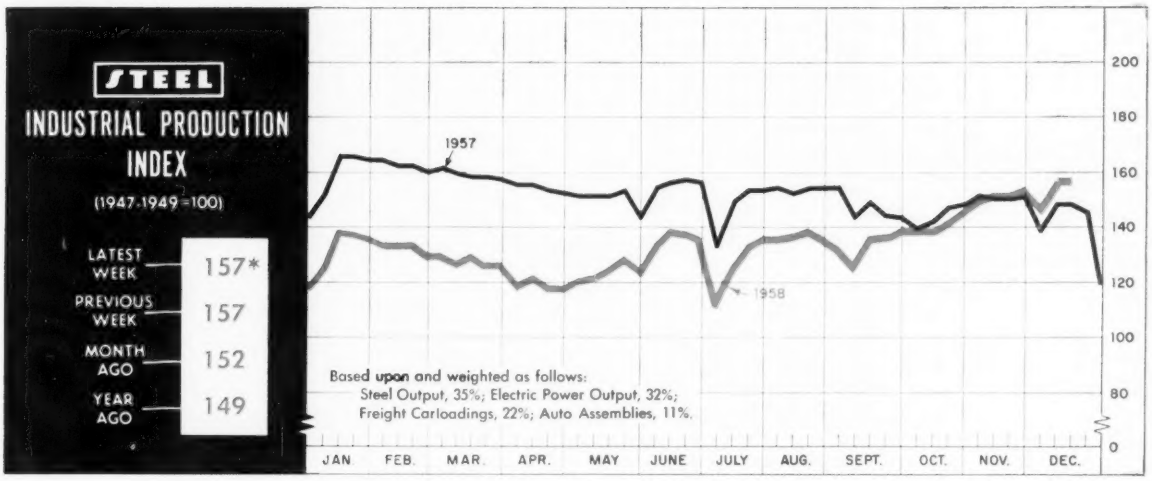

*Week ended Dec. 13.

Yuletide Business News Brightens

BUSINESSMEN will get what they wanted for Christmas: A return of business confidence and a higher level of activity.

• **Production** — Industrial production is on its highest plane since October, 1957, on the basis of the Federal Reserve Board's monthly report. Its index of total production jumped up 3 points from the strike-retarded pace of October to a preliminary 141 (1947-49 = 100). As predicted first in these columns on Nov. 24 (p. 75), this seasonally adjusted index resumed the 2 to 4 point monthly advance that characterized the recovery in its early stages.

The main strength came from the auto industry, but the FRB points out that significant gains were recorded throughout manufacturing.

• **Almost Recovered**—The board's trend line plummeted 19 points (from peak to trough) during the recession. It has regained all but 4 points. STEEL's industrial production index (above), which usually tips off the direction of the FRB indicator several weeks in advance, shows that more recession losses will be recouped this month. Our index, which is momentarily stalled at 157 (1947-49 = 100) by autoworkers' strikes against Chrysler Corp., is expected to reach its peak in the week ended Dec. 20. If auto producers are permitted to meet their schedules, the top will be close to 160, which will mean an advance in the FRB index of another 2 or 3 points for the month. If the Chrysler strike continues, both indexes will peak out at slightly lower levels.

While STEEL's trend line has already moved above its prerecession level of 155 (set in late August, 1957), it will be the first quarter of 1959 before the seasonally adjusted index of the FRB will move into similar territory. It will be early spring before either barometer matches its all-time high (168

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,036[1]	1,985	1,742
Electric Power Distributed (million kw-hr)	13,200[1]	13,017	12,570
Bituminous Coal Output (1000 tons)	8,620[1]	7,540	9,230
Crude Oil Production (daily avg—1000 bbl)	7,000[1]	7,067	6,884
Construction Volume (*ENR*—millions)	$353.3	$399.1	$226.5
Auto, Truck Output, U. S., Canada (*Ward's*)	172,021[1]	179,872	175,252
TRADE			
Freight Carloadings (1000 cars)	580[1]	594	603
Business Failures (Dun & Bradstreet)	294	244	287
Currency in Circulation (millions)[3]	$32,218	$32,057	$31,827
Dept. Store Sales (changes from year ago)[3]	+7%	+2%	−5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,700	$21,843	$21,660
Federal Gross Debt (billions)	$282.9	$282.8	$274.7
Bond Volume, NYSE (millions)	$32.4	$31.9	$30.0
Stocks Sales, NYSE (thousands of shares)	19,095	17,565	11,847
Loans and Investments (billions)[4]	$94.9	$95.2	$86.9
U. S. Govt. Obligations Held (billions)[4]	$32.1	$32.5	$25.6
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	217.3	217.5	206.5
All Commodities[7]	119.0	119.0	118.1
Commodities Other than Farm & Foods[7]	127.0	127.0	125.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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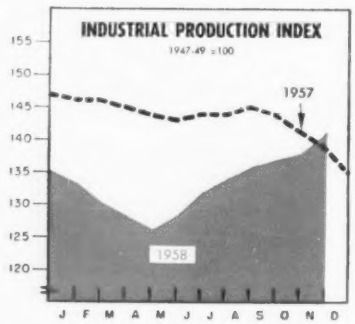
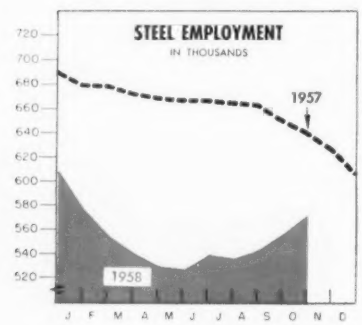
YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly

THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1958	1957	1958	1957	1958	1957
Jan.	133	145	100	143	159	180
Feb.	130	146	95	143	153	180
Mar.	128	145	91	137	150	179
Apr.	126	144	86	134	146	176
May	128	144	91	132	148	175
June	132	145	103	132	151	178
July	134	145	102	132	154	178
Aug.	136	145	109	136	156	178
Sept.	137	144	113	131	156	176
Oct.	138	142	118	128	156	172
Nov.	141*	139	...	121	...	170
Dec.	...	135	...	107	...	163
Avg	...	143	...	132	...	175

Federal Reserve Board. *Preliminary.
Charts copyright, 1958, STEEL.

	Employment in Thousands		Payroll in Millions	
	1958	1957	1958	1957
Jan.	575	678	$297.4	$360.4
Feb.	554	677	261.7	327.5
Mar.	539	671	271.8	344.2
Apr.	529	668	259.1	331.5
May	527	666	270.1	338.0
June	538	666	278.6	324.8
July	536	665	280.1	334.6
Aug.	542	663	299.1	343.7
Sept.	555	651	308.1	330.1
Oct.	569	640	341.7	345.6
Nov.	...	626	....	316.3
Dec.	...	606	....	299.6

American Iron & Steel Institute.

in early December, 1956, for STEEL, and 147 during that month for FRB).

• **Employment**—The second word of cheer comes from the Department of Labor, which reports that nonfarm employment took a counterseasonal swing upward during November, reaching 51.3 million. Most of the increase came in manufacturing, which normally drops during the month. The return of nearly normal scheduling in the automotive industry was the big reason here, too.

Along with greater employment came longer hours and higher wages. The workweek expanded from 39.7 hours in October to 39.9 hours last month and boosted the gross weekly earnings to a new high of $86.58. Every manufacturing industry shared in the advance, resulting in a gain of $3.66 a week over the year for manufacturing as a whole.

• **Unemployment** — Even though the jobless total remained at October's 3.8 million level, the rate of unemployment, adjusted for seasonal influences, dropped to a ten-month low of 5.9 per cent in November. Reason: It is customary for unemployment to show a significant rise as the agricultural season wanes.

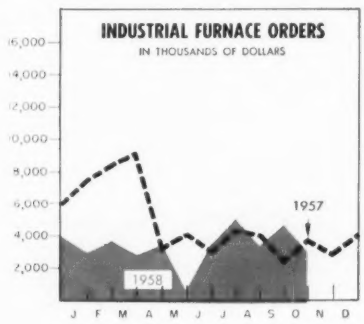
• **Better Climate**—Reflecting these better business conditions is the unusual drop in the number of business failures last month. Dun & Bradstreet Inc. reports that only 1121 businesses folded, a drop of 12 per cent from the October figure. The decline was limited to small and medium size companies, and all types of businesses except construction contributed to the dip. Six of nine geographic areas had fewer failures last month than in October.

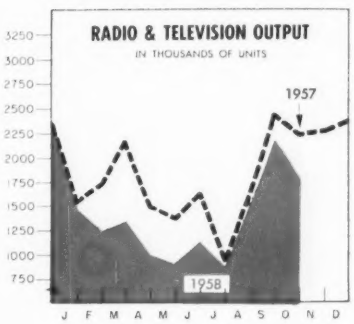
The only note of caution in the report: Liabilities continued to climb, hitting $56.7 million. This is because concerns with liabilities of $100,000 or above bucked the trend last month.

Forecasters Optimistic

Yearend forecasts are also putting businessmen in a good mood for the holidays. Last year, caution or outright pessimism was the vogue, but this year optimism is the rule—sometimes without too much caution.

One forecast worth noting in some detail comes from the Cleve-





	1958	1957*	1956*
Jan.	3,045	7,380	10,244
Feb.	3,684	8,373	12,163
Mar.	2,871	9,090	7,025
Apr.	3,572	3,164	8,803
May	953	3,994	3,667
June	3,672	2,974	4,748
July	5,169	4,332	4,140
Aug.	3,533	3,924	6,722
Sept.	4,846	2,337	3,057
Oct.	3,105	3,621	8,741
Nov.	....	2,832	3,986
Dec.	....	3,992	5,858

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

	Radio		Television	
	1958	1957	1958	1957
Jan.	1,027	1,086	434	450
Feb.	878	1,265	370	465
Mar.	931	1,609	417	560
Apr.	697	1,116	303	361
May	655	1,024	267	342
June	774	1,088	377	544
July	622	613	275	360
Aug.	1,029	966	508	674
Sept.	1,567	1,611	622	833
Oct.	1,306	1,569	496	662
Nov.	....	1,689	...	575
Dec.	....	1,793	...	574
Totals	....	15,429	...	6,400

Electronic Industries Association.

land Trust Co. In recent years the bank's economists have been middle roaders in their yearend prediction. Here's what they see for 1959:

Gross national product: An 8 or 9 per cent growth in this catchall indicator.

FRB index: 8 to 10 per cent higher than 1958's average of about 134.

Steel production: 110 million tons, maybe a bit more.

Auto output: 5.7 million cars, give or take 5 per cent.

Housing starts: 1.2 million, a bit better than this year's 1,160,000 starts.

Consumer prices: A rise of about 1.5 per cent over the 1958 average of 123.7 (1947-49 = 100).

Personal income: A gain of 6 per cent over the 1958 total to about $376 billion.

Consumers' spending: A rise to $310 billion over 1958's $290 billion, with the biggest percentage increase coming in durable goods.

Government spending: A climb from $52.5 billion in 1958 to $56.5 billion next year. State and local spending to go from $39.5 billion to $42.7 billion.

New plant and equipment: A moderate increase to $32 billion next year.

Construction: An improvement of 6 or 7 per cent.

Installment debt: A reverse of this year's downtrend.

Executives Bullish, Too

Nine-tenths of the executives in 189 manufacturing companies surveyed by the National Industrial Conference Board anticipate an increase in new orders during the first half of 1959, compared with the corresponding 1958 period. And almost as many expect the advantage to hold in comparison with the current period.

The respondents, while not quite as bullish in other respects, feel that dollar billings, production, and profits will also top the levels of this year's first half.

But perhaps even more important is the feeling among the executives that the first half of 1959 will be better than the current period, indicating their confidence that the upturn will continue to gain strength after the holidays.

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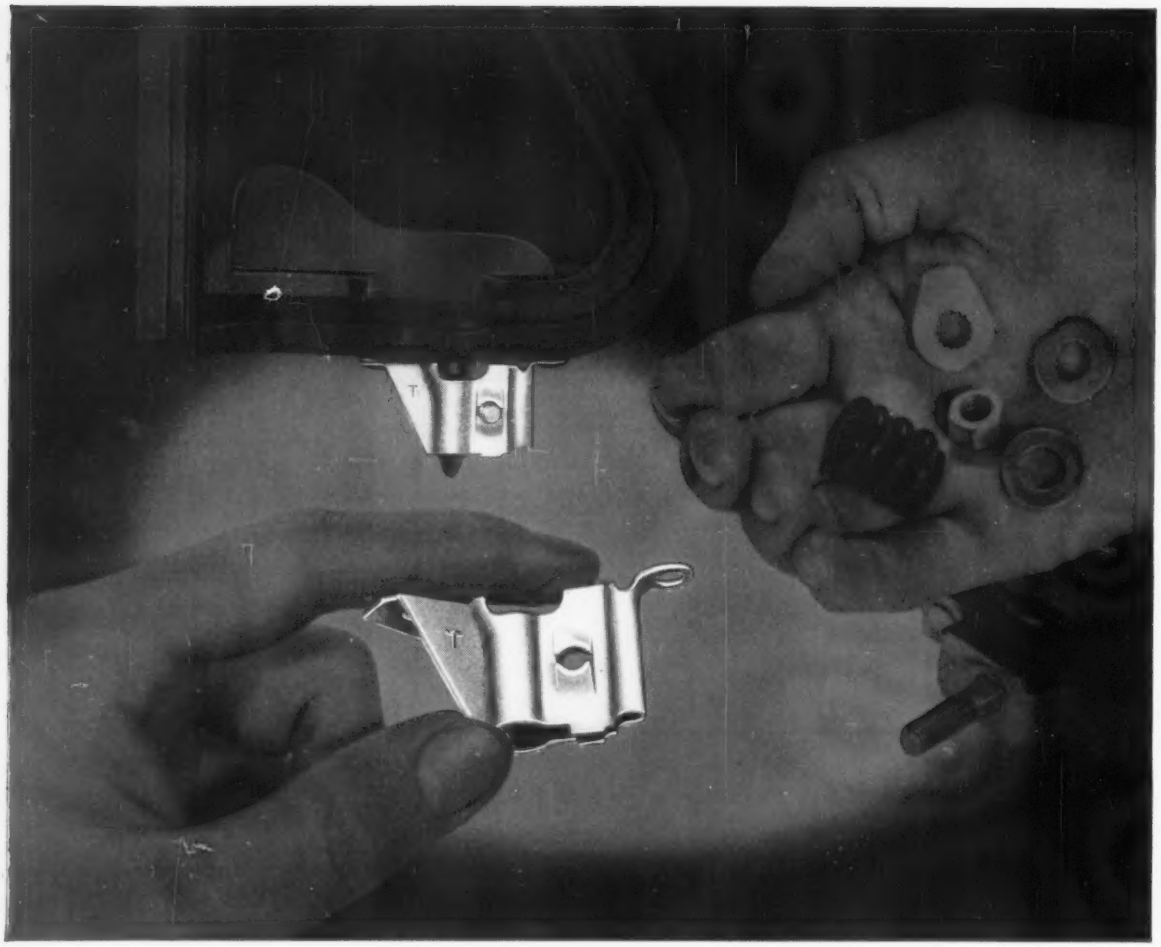

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JOHN P. MOFFAT JR.
Electro Mechanical chief eng.

DR. RALPH A. SCHAEFER
Bunting Brass research dir.

DWIGHT VANDEVATE
Gleason Works gen. mgr.

J. LINDSAY JOHNSON
Interlake Iron post

John P. Moffat Jr. was made chief engineer, **Electro Mechanical Instrument Div.**, Consolidated Electrodynamics Corp., Pasadena, Calif., a new post. He was director of quality control for the division. **W. J. Busteed** was made manager of quality control, Electro Mechanical Instrument Div., succeeding Mr. Moffat.

Dr. Ralph A. Schaefer was appointed director of **Bunting Brass & Bronze Co.'s** new research and development department, Toledo, Ohio. He was technical adviser to the president of Cleveland Graphite Bronze Div., Clevite Corp.

Dr. Lauchlin M. Currie was elected a vice president of **Babcock & Wilcox Co.**, New York, and placed in charge of its atomic energy division. To accept the new B&W post, Dr. Currie retired as a vice president of Union Carbide Nuclear Co., a division of Union Carbide Corp.

Harold Alwart, chief engineer, was elected vice president-engineering, **Clayton Mark & Co.**, Evanston, Ill. **Clarence Mark Jr.**, vice president, was also named treasurer. **Walter N. Matthias** was named to the new office of controller.

RT&E Corp., Waukesha, Wis., elected **Clyde W. Shaw** executive vice president; **Edwin A. Link** vice president-engineering.

American Air Filter Co. appointed **John J. Willis** to the new post of midwest regional manager, Chicago. **A. B. Ullrich Jr.** was made southern regional manager, Houston, succeeding **Morris G. Munson.**

Dwight VandeVate was appointed general manager, **Gleason Works,** Rochester, N. Y. He joined the company in 1921. After serving as works manager, he became a vice president in 1951. **Randolph E. Carson,** secretary since 1955, was elected secretary-treasurer.

Harlan E. Eastman fills the new post of purchasing administrator for **Beckman Instruments Inc.**, Fullerton, Calif. He co-ordinates purchasing for the six operating divisions and a subsidiary. He joined Beckman in 1957 as purchasing agent for the **Helipot Div.** after serving 13 years as purchasing manager for Clary Corp. **Brice James** was made sales promotion assistant for Helipot. **Forrest P. Dewey** fills a new post at Beckman as manager of cost and accounting methods.

Richard R. Swanson was elected executive vice president, **Grip Nut Co.**, South Whitley, Ind. He was a vice president in the railroad and lock nut sales division.

John W. Cochrun was elected executive vice president, **Electrical Products Research & Development Inc.**, Toledo, Ohio. He was with DeVilbiss Co.

Ralph W. Skerratt Jr. was named president, **Falcon Foundry Co.**, Lowellville, Ohio, to succeed the late **L. M. Nesselbush.**

Raymond C. Skoe, former sales promotion manager, was appointed vice president-sales for **Transistor Electronics Corp.**, Minneapolis.

J. Lindsay Johnson, general superintendent of the Toledo, Ohio, plant of **Interlake Iron Corp.**, moves to Cleveland headquarters to head the company's new department of planning and development.

J. L. Stackhouse Jr. was named manager of engineering administration for **DeWalt Div.**, Lancaster, Pa., American Machine & Foundry Co., a new post.

R. M. Gordon, former general sales manager, **Milford Rivet & Machine Co.**, Milford, Conn., was named vice president-sales.

Mack C. Johnson was appointed marketing manager for low voltage distribution equipment and motor control, **Federal Pacific Electric Co.**, Newark, N. J. He is responsible for product planning, price policy, and sales promotion.

Samuel Greenwald was elected president and chief executive officer of the newly formed **Hammond Valve Corp.**, Hammond, Ind. It was formed through purchase of Hammond Brass Works Inc., of which Mr. Greenwald was president. The new company operates as a subsidiary of Consolidated Diesel Electric Corp., Stamford, Conn.

J. T. Sabol was made district manager of **Inductotherm Corp.'s** new Cleveland district office. He had served 14 years with Tocco Div., Ohio Crankshaft Co.

James W. Jacobs was promoted to manager of research and future products engineering, **Frigidaire**

HAROLD E. BARNUM
Vanadium foundry div. post

E. F. ANDREWS
Allegheny Ludlum purchasing

COLIN SHARP
Brown & Sharpe div. mgr.

GILBERT R. SEMANS
Byers chief steel metallurgist

Div., Dayton, Ohio, General Motors Corp.

Vanadium Corp. of America appointed **Harold E. Barnum** assistant manager, foundry division, at Detroit.

E. F. Andrews was appointed assistant to the vice president-purchases, **Allegheny Ludlum Steel Corp.**, Pittsburgh. He was with Pitman-Moore Co., division of Allied Laboratories Inc., serving as director of operations.

David A. Thomas was elected vice president and general manager, industrial and automation division, **Radio Corp. of America.** He heads the recently formed division which is concerned with development and production of automation equipment for a variety of industrial uses, and which is part of RCA's industrial electronic products grouping. Former chairman and president of Babb Co., Mr. Thomas joined RCA last year as manager, industrial business development. **Harold M. Emlein** was named operations manager of the new division. He was manager, RCA industrial and audio products department.

Samuel P. Whiteside was appointed northeastern regional sales manager for **Kaiser Aluminum & Chemical Sales Inc.** He succeeds **R. E. Belknap**, named to the new post of eastern division manager of trade relations. They have headquarters in New York.

Wainwright Holt Jr. was appointed sales manager of centrifugal and axial compressors, **Allis-Chalmers Mfg. Co.**, Milwaukee.

Brown & Sharpe Mfg. Co., Providence, R. I., appointed **Colin Sharp** as west coast manager of its cutting tool division.

Frank C. Watson was elected president of **Youngstown Welding & Engineering Co.**, Youngstown. He succeeds his uncle, **Charles G. Watson**, who was elected chairman.

Homer F. Griffith was appointed manager of **International Harvester Co.**'s tractor works in Chicago. He succeeds **H. A. Torgersen**, who was named manager of Harvester's Ft. Wayne, Ind., works.

Wilfred H. Stewart was named manager of engineering services, refractories division, **H. K. Porter Company Inc.**, at Pittsburgh. He was with the industrial furnace division of Sunbeam Corp.

Thomas R. Gerosky was made Chicago district sales manager, **American Chain Div.**, American Chain & Cable Co. Inc.

Edward K. Lefren, assistant director of operations for the explosives department, **Hercules Powder Co.**, Wilmington, Del., was appointed to the new post of manager of technical services for the engineering department.

Brush Instruments Div., Clevite Corp., promoted **Cole D. Bacon** to western regional sales manager, Los Angeles.

Brig. Gen. Thomas B. White, (USMC, ret.), was promoted to military sales manager of **Potter & Brumfield Inc.**, Princeton, Ind. General White was formerly special projects engineer.

Gilbert R. Semans was appointed chief steel metallurgist of **A. M. Byers Co.**, Pittsburgh. Before joining Byers, he was director of metallurgy at Jessop Steel Co., and research associate and director of the metallurgical laboratory at Universal-Cyclops Steel Corp.

Homer R. Oldfield Jr. was appointed assistant manager, government equipment division, **Raytheon Mfg. Co.**, Waltham, Mass. He was general manager of General Electric Co.'s computer department at Phoenix, Ariz.

Arthur F. Hildebrandt was appointed works auditor of **U. S. Steel Corp.**'s Gary, Ind., sheet and tin mill. He succeeds **Edwin J. Bickerton**, retired.

Controls Co. of America, Schiller Park, Ill., promoted **Phil Bain** to product line manager, industrial and commercial controls sales. **H. R. Chapin** was named chief product engineer, appliance and automotive controls; **J. J. Kaleba**, engineering supervisor, switch group; **Marshall Zugehar**, sales co-ordinator, international division, and also for automotive sales.

James G. Donohue was named sales engineer, Chicago territory, for technical products division, **Mine Safety Appliances Co.**

D. J. Shellenberger was made supervisor-chemical engineering services for **Jones & Laughlin Steel Corp.**, Pittsburgh. He was a senior process engineer.

William C. Prigge was named western district sales representative for **Kobe Inc.**'s industrial sales organi-

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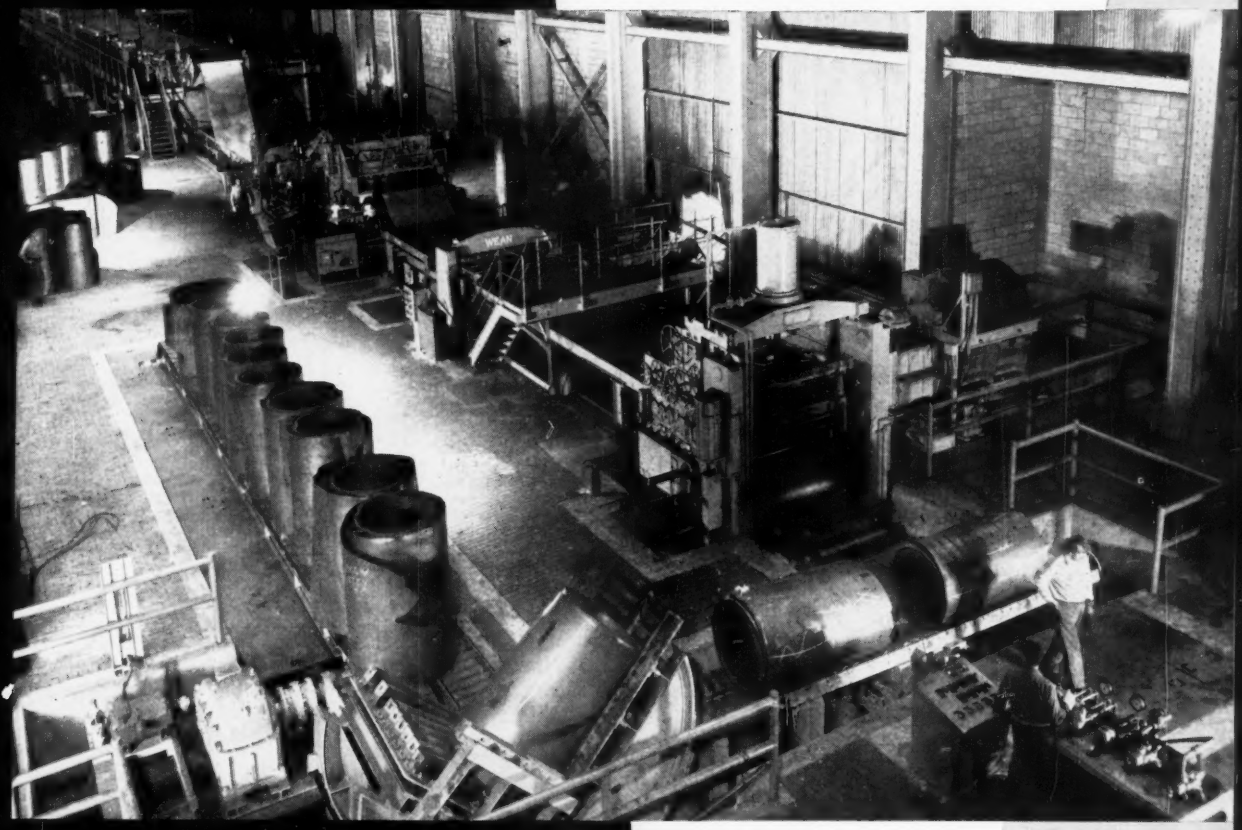
CREATIVE ENGINEERING

improves continuous Strip Pickling



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WEAN

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO

ROBERT E. SCHWARY
Hydreco engineering mgr.

THOMAS W. MORRISON
SKF engineering aide

JOHN T. GARTRELL
Birdsboro-Mirawal Div. mgr.

ROBERT R. SHELLMAN
Eastern Heat Treating post

T. JAMES KAVANAGH
Wheatland Tube president

GEORGE D. STUTZMAN
new post at Latrobe Steel

zation. He is at Huntington Park, Calif.

Robert R. Shellman was elected vice president and general manager, **Eastern Heat Treating & Brazing Corp.**, Glen Cove, N. Y. He was formerly with L. R. Heat Treating Co., Newark, N. J.

T. James Kavanagh was elected president, **Wheatland Tube Co.**, Philadelphia. He joined the firm when it was founded in 1930. **Edward J. Kavanagh** was elected executive vice president; **Chris Schurr**, treasurer; **Karl F. Lukens**, vice president-sales; **Henry J. Dougherty**, secretary. These men will also serve in their new capacities as executives of **Wheatland Steel Products Co.**, **John Maneely Co.**, and **Maneely Inc.** General offices of all four corporations are in Philadelphia.

Sidney A. Lewis was appointed manager of technical sales service for **Walworth Co.**, New York. He will also be manager of bronze valves sales.

George D. Stutzman was made manager of the new conversion sales department of **Latrobe Steel Co.**, Latrobe, Pa. He was assistant manager of sales service.

David C. Haney was appointed superintendent; **Hugh L. Kells**, assistant superintendent, fuel and power department, Youngstown district, **Youngstown Sheet & Tube Co.** Mr. Haney succeeds **Emil A. Vierow**, recently made assistant to the district manager.

William A. Hobbs was elected financial vice president, **M. A. Hanna Co.**, Cleveland, effective in February. He was a partner in charge of securities research for Clark, Dodge & Co., New York investment firm.

Meril E. Johnson was made manager of the Washington office of **AC Spark Plug Div.**, General Motors Corp. **Gordon F. Arndt** was made subcontractor administrator in the division's purchasing department, Milwaukee. **Francis P. Doonan** was made west coast military sales representative.

Robert E. Schwary was made manager of engineering for New York Air Brake Co.'s **Hydreco Div.**, Kalamazoo, Mich. He replaces **R. F. Hodgson**, appointed general sales manager. Mr. Schwary was chief engineer, gear pumps and cylinders.

Thomas W. Morrison was appointed assistant to the engineering and research vice president of **SKF Industries Inc.**, Philadelphia. **Tibor E. Tallian**, former supervising research engineer, was advanced to manager of the research laboratory. **Frank W. Wellons** was made chief engineer.

John T. Gartrell was appointed general manager, Mirawal Div., **Birdsboro Steel Foundry & Machine Co. Inc.** He will be at Birdsboro, Pa., in the general office of the division. The Mirawal continuous process porcelain plant is in Kernersville, N. C. Mr. Gartrell formerly was vice president, Browne Window Corp.; president of Glide-In Mfg. Corp.; and vice president of Timber Structures Inc.

La Salle Steel Co., Hammond, Ind., elected **Joseph Scodro** controller; **Ronald A. Alitto**, assistant secretary.

OBITUARIES...

Verne E. Minich, founder and honorary chairman, **Wheelabrator Corp.**, Mishawaka, Ind., died Dec. 13.

A. J. Miller Sr., chairman, **Chicago Wheel & Mfg. Co.**, Chicago, died Dec. 9.

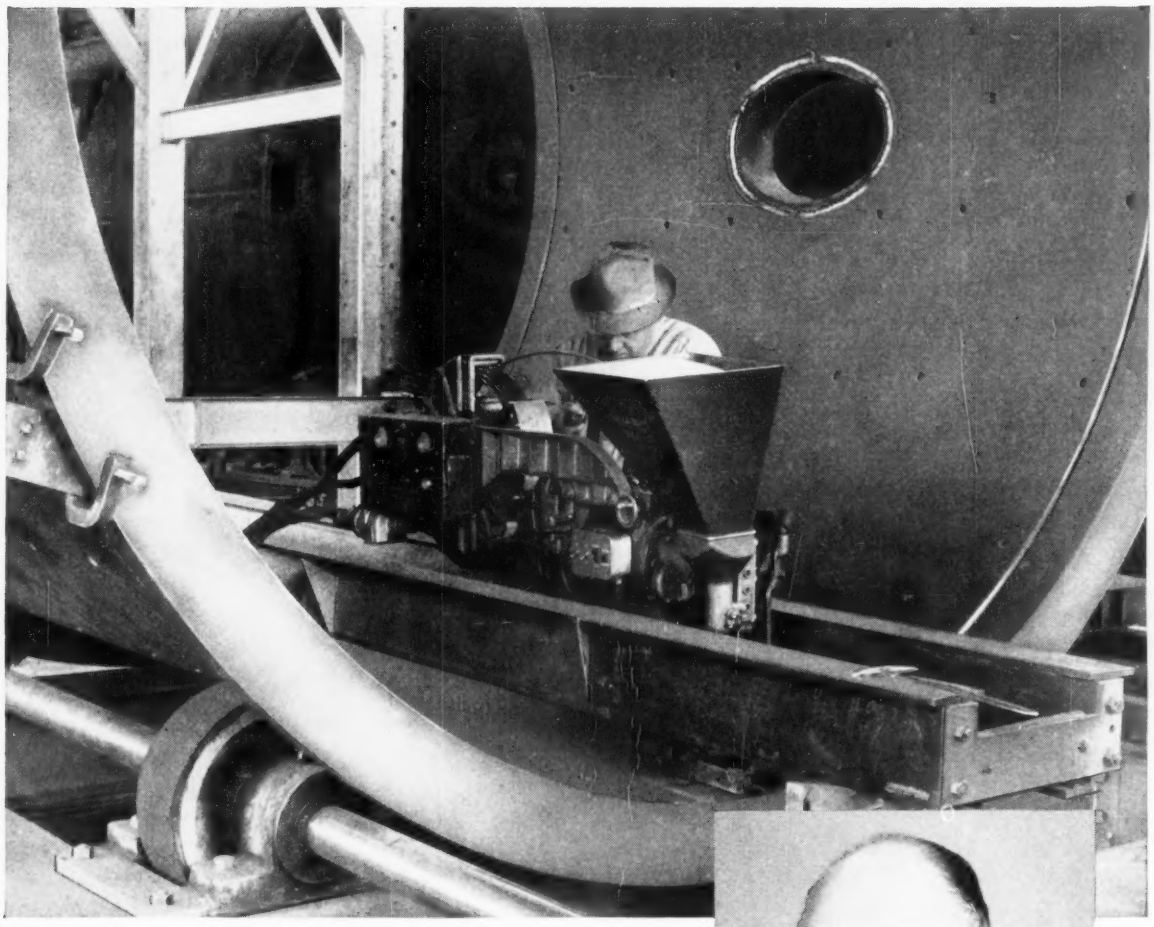
Herman H. Miller, 68, president, **Miller Bros. Iron & Metal Co.**, Milwaukee, died Dec. 4.

E. J. Daehn, 72, retired superintendent, **Pelton Steel Casting Co.**, Milwaukee, died Dec. 5.

A. L. Elliott, 66, recently retired vice president, **International Harvester Co. of Canada**, died Dec. 5 in Hamilton, Ont.

Louis W. Kemp, 55, eastern regional industrial sales manager, **Behr-Manning Co.**, Albany, N. Y., died Dec. 8.

Joseph T. Lawler, 62, president, **Mac-Law Tool Aircraft Parts Corp.**, Syracuse, N. Y., died Dec. 7.



Many of Mine and Smelter's Marcy grinding mills are equipped with Standard Steel flange rings, shown above. No flange ring replacements have ever been required. Some of these mills have been operating 24 hours a day for more than 15 years.

"'Dependability' is the keyword in our very fine relationship with Standard Steel"

We at Standard are happy indeed that Mine & Smelter Supply Co.'s chief engineer, J. R. Grout, appreciates the efforts we have gone to over the years to combine dependable service with our know-how and quality standards.

We consider it our responsibility to help maintain the world-wide reputation for quality mining and industrial equipment which Mine & Smelter Co.'s Marcy Mill Division enjoys by providing this customer with the same fine service it renders, in turn, to *its* customers.

Won't you discuss your needs for weldless rings, flanges, forgings and castings with us. You will appreciate our personalized service. Write Dept. 2-M.

"Standard Steel for many years has been supplying our company with shell flange rings, as well as riding and roller tires for use on our Marcy Grinding Mills and other rotary-type equipment. Their product quality and cooperation have helped make it possible for us to serve our customers promptly—our company policy. I believe the word 'dependability' is the keyword in our very fine relationship with Standard Steel," says Joseph R. Grout, chief engineer, Marcy Mill Division, Mine & Smelter Supply Co.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

Gets Brazil Contract

Kaiser will build steel plant with capacity of 330,000 net tons at Piacaguerta

A MULTIMILLION dollar steel plant contract has been awarded to the Heavy Construction Div., Henry J. Kaiser Co., Oakland, Calif., by Companhia Siderurgica Paulista (Cosipa) of Sao Paulo, Brazil.

The project, at Piacaguerta, is valued at $170 million. The integrated steel plant will have an annual capacity of 330,000 net tons of rolled steel products. Facilities include an oxygen producing plant and a 30,000 kw steam powerplant.

Solar Aircraft Expanding

Solar Aircraft Co., San Diego, Calif., will build a 60,000 sq ft engineering and research building and a huge furnace for heat treating and brazing missile components. Solar's new furnace will be 31 ft deep and 15 ft in diameter. It will handle missile fuel tanks and other components up to 9 ft in diameter and 30 ft long.

Forms Datagraphic Firm

Douglas Aircraft Co., Santa Monica, Calif., and General Aniline & Film Corp., New York, formed a jointly owned company, Datagraphic Systems Inc. The new enterprise will develop new machines, materials, techniques, processes, and systems in the microfilm and reproduction field. Headquarters are at 850 Pico Blvd., Santa Monica, Calif. General manager is R. A. Ellsworth.

Drill Rights Sold

Rights to manufacture the "Winkie," a lightweight, gasoline driven drill, were sold to Bucyrus-Erie Co., South Milwaukee, Wis. Fred W. Wink, the inventor, will join the firm.

Hufford Gets Transrector

Hufford Corp., El Segundo, Calif., a division of Siegler Corp., received a $225,000 contract from Thiokol Chemical Corp. to build the "Transrector." The mobile handling unit for transporting and positioning giant rocket engines is 35 ft long, 85 in. in diameter, and weighs 80,000 lb.

Coal Pipeline To Be Built

A 30 mile coal pipeline will be built between East Liverpool, Ohio, and Youngstown by the newly organized Youngstown Coal Pipeline Co. The $10 million project will start next spring.

The line will bring coal from an Ohio River barge terminal, where it is crushed and mixed with water to form a slurry before shipment through the pipe.

Avco Forms New Division

Avco Mfg. Corp. will form a new division at Nashville, Tenn., effective Jan. 1, 1959. The facilities were formerly part of Avco's Crosley Div.

The Nashville Div. engineers and produces aircraft structures and assemblies, Avcomb stainless steel and honeycomb panels, components for radar systems, and home appliances. John Mihalic, vice president of the Crosley Div., has been named president of the Nashville Div.

Industrial Units Renamed

Consolidated Electrodynamics Corp., Pasadena, Calif., changed the name of its Central Mfg. Div. to **Electro Mechanical Instrument Div.** A. P. Stuhrman has been appointed director of the division. Major products of the unit include dynamic-recording and data-processing instruments and auxiliary equipment, and high-altitude electrical connectors.

Johnston & Funk Titanium Corp., Wooster, Ohio, a subsidiary of Mallory-Sharon Metals Corp., Niles, Ohio, changed its name to **Johnston & Funk Metallurgical Corp.** The firm makes reactive and refractory metals at its main plant at Wooster and at a plant at Huntsville, Ala., which it operates for Mallory - Sharon. Facilities are maintained for ingot melting in electrode vacuum furnaces, billet conditioning, rolling, wire drawing, cleaning and pickling, wire straightening, and strip and foil rolling. The company is also equipped to handle special research and quality control projects relating to the development and special application of common and rare metals.

Knudsen Shipbuilding & Dry Dock Co. Inc., Superior, Wis., changed its name to **Fraser-Nelson Shipbuilding & Dry Dock Co. Inc.**

Moves Grinding Wheels Div.

United States Rubber Co., New York, is moving its Grinding Wheels Div. from Ft. Wayne, Ind., to 10 Eagle St., Providence, R. I., and will discontinue its Ft. Wayne operation around the end of the year. New facilities in Providence will handle the manufacture of resin and rubber bonded grinding wheels.

CONSOLIDATIONS

Gabriel Co., Cleveland, purchased **Talco Engineering Co.**, Mesa, Ariz., producer of rocketry and missile devices. John H. Briggs is president of Gabriel.

Continental Can Co., New York, will merge its subsidiaries, **Gair Co. Canada Ltd.** and **Continental Can Co. of Canada Ltd.**, on Jan. 1. It will operate the properties under the name of Continental Can Co. of Canada Ltd. Headquarters will be at 111 Richmond St., W., Toronto, Ont., until Aug. 1, 1959, when they'll be moved to the Continental Can Bldg., 790 Bay St., that city. Officers of the consolidated company will include: Chairman, David H. Ross; president and general manager, F. A. Whittall; executive vice president, J. A. Stewart; vice president and head of the Metal Div., E. E. Fry; vice president and head of the Gair Paper Product Div., W. George Cowan.

Frank Samuel & Co. Inc., Philadelphia, acquired **Kittanning Refractories Inc.**, Kittanning, Pa., maker of ladle brick, sleeves, nozzles, acid brick, and refractory specialties. S. L. Shober Jr., president of Kittanning Refractories, joins Frank Samuel & Co. as vice presi-

dent in charge of the Refractories Div. regional office in Pittsburgh.

International Iron Works Inc., Chicago, purchased **Eggers Iron Co.**, that city, builder of structural steel and ornamental iron and aluminum products for building contractors. Manufacturing facilities of Eggers Iron will be moved to a 30,000 sq ft plant being completed by International Iron at Wheeling, Ill.

Allis-Chalmers Mfg. Co., Milwaukee, will acquire **S. Morgan Smith Co.**, York, Pa., subject to the approval of Smith's stockholders. If the proposal goes through, management of the Smith firm is expected to continue to operate the York plant. The company makes hydraulic turbines, valves, water handling equipment, axial flow pumps, controllable pitch marine propellers, and other special machinery.

Tantalum Defense Corp. has been consolidated with its parent firm, **Fansteel Metallurgical Corp.**, North Chicago, Ill. The tantalum-columbium producing plant at Muskogee, Okla., will be operated by Fansteel under the same management.

Enthone Inc., New Haven, Conn., a subsidiary of American Smelting & Refining Co., New York, will take over and continue in its own name the business of its subsidiary, **Comco Inc.**, on Jan. 1. J. J. Martin Jr. has been appointed general manager of the new Enthone Equipment Dept. Comco makes metal finishing equipment and complete treatment facilities for plating room wastes and fabricates corrosion resistant plastic tanks and exhaust casings for the chemical process industries.

REPRESENTATIVES

William K. Stamets Co.'s Pittsburgh office has been named a dealer for the Torc-Pac line of open back, inclinable presses manufactured by **Clearing Div.** of **U. S. Industries Inc.**

Metal Industries Inc., Clearwater, Fla., and El Monte, Calif., manufacturer of grilles, registers, and other fabricated aluminum products for the building industry, has named **Air Conditioning Supply Co.**, Los Angeles, as exclusive distributor in southern California.

NEW OFFICES

Engelhard Industries Inc., Newark, N. J., opened a general sales office at 1125 Mercantile Dallas Bldg., Dallas.

Weston Instruments Co., a division of **Daystrom Inc.** has opened four new upper New York State sales offices. Weston's Buffalo district office has been relocated at 4446 Main St. H. B. McCarty has been promoted to district manager. The new Syracuse district office is at 4308 E. Genesee St., DeWitt. Edwin D. Brown is district manager. A. R. Walthers is in charge of the Albany office now at 5 Herbert Dr., Latham. The Rochester office, 207 Burke Bldg., is under the supervision of Joseph Cox, sales engineer.

Fuller Co., Catasauqua, Pa., established a district office at 380 Madison Ave., New York. Andrew van der Lyn is manager. The firm is a subsidiary of General American Transportation Corp., Chicago.

Brasco Mfg. Co., Monroe, Mich., will move 1 mile north of Monroe on North Dixie Highway. The company makes aluminum products.

NEW PLANTS

Clayton Mfg. Co., maker of dynamometers, steam generators, steam cleaners, and portable heaters, has moved its Cincinnati headquarters to 3051 Exon Ave., Evendale, Cincinnati. The new building will serve as a training school, a warehouse, a manufacturing plant for steam cleaning compounds, and a distribution center.

Crucible Steel Co. has opened a warehouse at 3303 South Ave., Toledo, Ohio. It will stock a full line of special purpose steels. J. H. Rolfe is warehouse manager.

Weston Hydraulics Ltd., North Hollywood, Calif., subsidiary of **Borg-Warner Corp.**, broke ground for a multimillion dollar plant at Van Nuys, Calif. Its functions: The development and production of components for aircraft, missiles, and rockets.

Weirton Steel Co., a division of **National Steel Corp.**, has expanded its operations with equipment installed by **E. W. Bliss Co.** The installations include a 4 high, 2 high tandem temper mill for rehardening strip prior to tin and zinc coating operations, a Bliss temper mill which rolls steels at rates up to 800 tons a day, and a new Bliss 48 in. slitting line.

Wisconsin Motor Corp. will erect an engineering building next to its W. Burnham Street plant in Milwaukee. The project will increase engineering space about 100 per cent. The one story structure will have 15,500 sq ft of floor space and will accommodate a staff of 50 to 75.

Hamilton Mfg. Co. will build a three story plant addition (to be erected on top of the present one story building) and a single level addition to its main office building.

Stromberg-Carlson Div. of **General Dynamics Corp.**, will construct a building adjacent to its present electronic systems plant at San Diego, Calif. It is the second major expansion of engineering and manufacturing facilities in a year.

ASSOCIATIONS

Irvin M. Bettman of David J. Joseph Co., Cincinnati, was elected president of the Cincinnati chapter, **Institute of Scrap Iron & Steel Inc.**

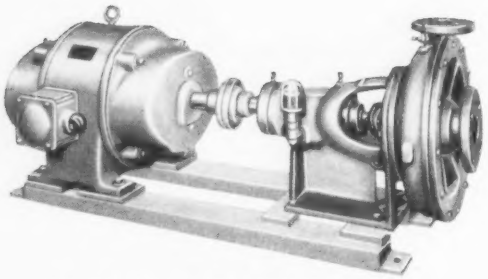
At the December meeting of the **Spring Manufacturers Association Inc.**, Harry C. Faust, president of Paragon Spring Co., Chicago, was named president. Walter Froelich of Associated Spring Corp., Bristol, is the new vice president.

American Mining Congress, Washington, has elected Raymond E. Salvati, president, Island Creek Coal Co., Huntington, W. Va., president of American Mining Congress.

Louis F. Polk, vice president and group executive, Bendix Aviation Corp., and president, Sheffield Corp., Dayton, Ohio, was elected president of **American Ordnance Association.**

Production-built AMPCO® Pumps, FAFNIR-equipped, do job of costly "specials"

Interchangeable parts cut costs . . . provide unique pump versatility

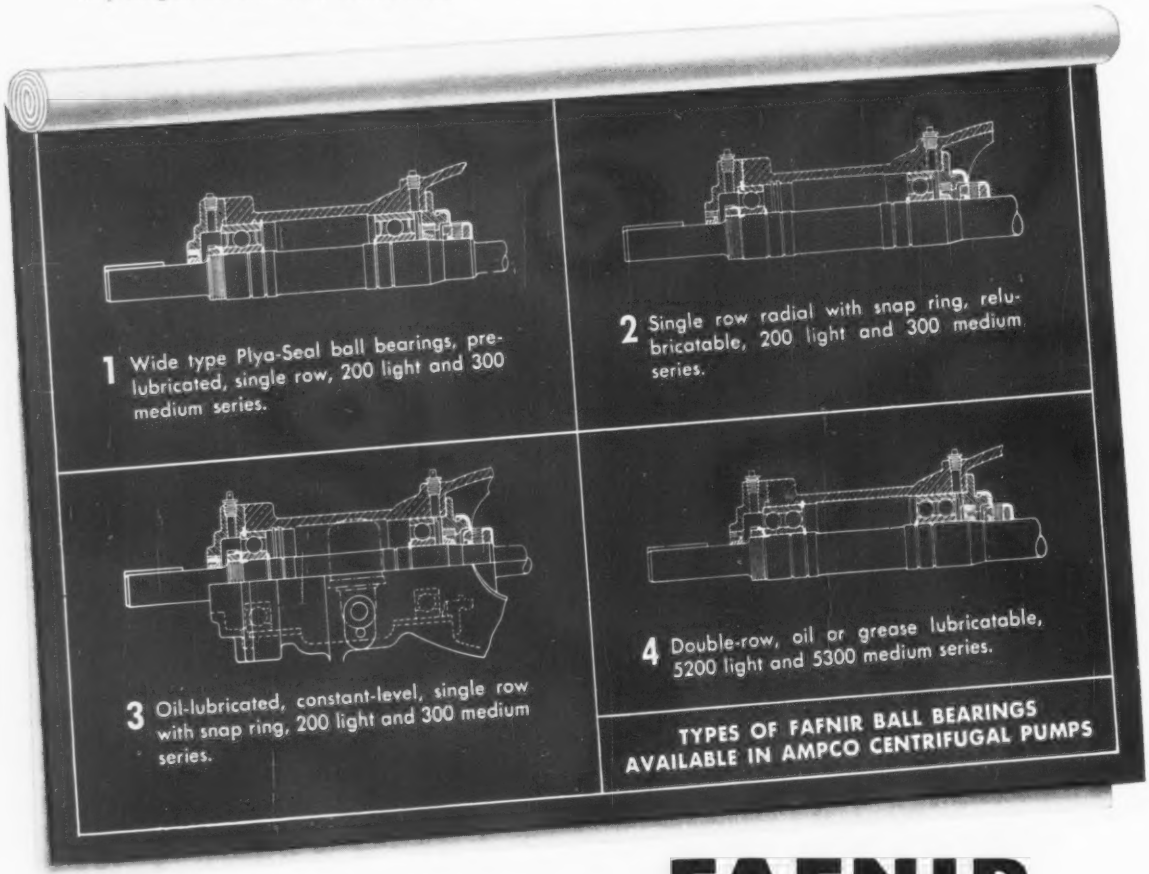


Versatile Ampco single-suction centrifugal pumps are available in sizes ranging from fractional flow to 600 gpm. They are particularly designed for corrosive or erosive fluids.

Centrifugal pumps manufactured with interchangeable parts by Ampco Metal, Inc., of Milwaukee are expressly designed to do jobs that would otherwise call for costly specials. They are also readily adaptable to new pumping requirements.

In designing this versatile pump series, Ampco needed various types of ball bearings. They found Fafnir had "all the answers" — bearings that met diverse size, load, speed, and lubrication requirements precisely.

Chances are, "the most complete line of ball bearings in America" holds the answers to *your* bearing problems. Write The Fafnir Bearing Company, New Britain, Conn.


1 Wide type Plya-Seal ball bearings, prelubricated, single row, 200 light and 300 medium series.
2 Single row radial with snap ring, relubricatable, 200 light and 300 medium series.
3 Oil-lubricated, constant-level, single row with snap ring, 200 light and 300 medium series.
4 Double-row, oil or grease lubricatable, 5200 light and 5300 medium series.
TYPES OF FAFNIR BALL BEARINGS AVAILABLE IN AMPCO CENTRIFUGAL PUMPS

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

Technical Outlook

December 22, 1958

MINERLESS MINING— Imagine a man mining coal in a business suit. Joy Mfg. Co., Pittsburgh, has such a project in the works. The firm says it will be operating a remotely controlled system on exposed seams in 1960. Automatic mining machines report their location and local mining conditions to an electronic control center outside the mine. The goal is automatic deep mining by '63.

CERMET EQUALS IRON— Ohio State University has come up with a cermet as elastic as iron. Working on Air Force projects, it found that certain alumina compacts fired in a helium-hydrogen atmosphere produced a nonporous cermet with the unusual property.

USES FOR LEVITATION MELTS— People who are intrigued with the exceptionally high purity of levitation melting are using the method for: 1. Casting of small test buttons. 2. Casting plates for x-ray diffraction and stock for service trials. 3. Sintering refractories that conduct electricity when hot. 4. Charging molten titanium with hydrogen for solubility studies. 5. Casting stainless steels which ordinarily require special, high cost crucibles. Research laboratories at Westinghouse Electric Corp., Pittsburgh, are doing much to broaden practical uses.

COMPUTERS AID MELT STUDY— Formulas for producing the cheapest stainless can be obtained in less than 5 minutes with the computer used by the metals research laboratories of Electro Metallurgical Co., a division of Union Carbide Corp., New York. The device considers metal analysis, oxygen, lime, and the prices of scrap and ferroalloys. Modifications can be studied in a short time.

CHEMICAL ELIMINATES SANDBLASTING— A little wire brushing, a phenolic resin primer, and a vinyl top coating are all you need to finish rusty metal surfaces. That's the latest system proposed by Union Carbide Plastics Co., a division of Union Carbide Corp., New York. Exposure panels in Florida and Pittsburgh stood up well in competition with epoxy and chlorinated rubber coatings on cleaned metal.

DIECASTING IMPROVES PLATING— W. H. Safranek, Battelle Memorial Institute, Columbus, Ohio, says two new plating systems for zinc diecastings offer "distinct improvements in corrosion performance." One, a copper-nickel-chromium combination, features a porefree chromium coating 25 millionths of an inch thin. The other is a double layer of nickel deposited in separate baths. Some auto parts are being plated with the new systems.

RECLAIMS GERMANIUM SCRAP— Sylvania Electric Products Inc., New York, says it has a plan to make germanium scrap recovery more profitable for the average user. High volume processing is said to be far more efficient than do-it-yourself methods. Details are available at Towanda, N. Y.

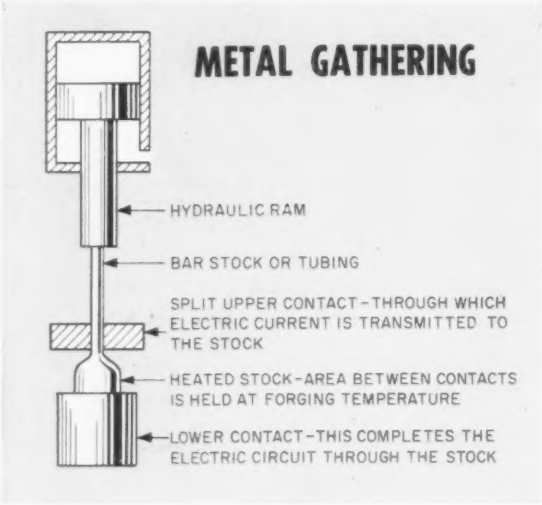
HEAT BARRIER CRACKS— A graphite that lasts ten times longer than conventional formulas at 5000° F has been developed by National Carbon Co., a division of Union Carbide Corp., New York. The firm expects to find a new family of materials that will withstand 10,000° F for prolonged periods.

MILDER RADIOACTIVE SOURCE— Inspection of thin aluminum and steel sections is now possible with a low energy radiation source called Samarium 153. The developer, General Motors Research Laboratories, Detroit, says the material must be renewed every week. It expects to supply licensed industrial and medical firms.

SWAGED CERMETS— You might consider swaging as a way to combine refractory metal powders or ceramics. GE's atomic energy plant at Richland, Wash., uses this simple procedure: Pack the mix into a ductile metal tube, close the ends with rubber stoppers, and swage.

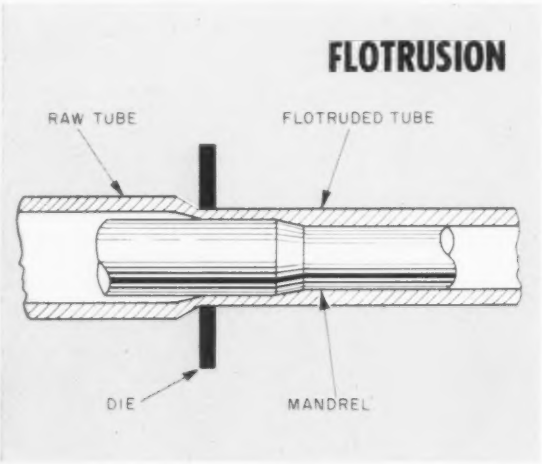
ALUMINUM, OUTDOOR STYLE— Exposure to weather shortens the fatigue life of some kinds of aluminum, says the National Aeronautics & Space Administration. Unclad 7075-T6 deteriorates twice as fast as the clad type. Clad 2024-T3 is apparently unaffected by such exposure.

These processes make it easy . . .


METAL GATHERING
HYDRAULIC RAM
BAR STOCK OR TUBING
SPLIT UPPER CONTACT – THROUGH WHICH ELECTRIC CURRENT IS TRANSMITTED TO THE STOCK
HEATED STOCK – AREA BETWEEN CONTACTS IS HELD AT FORGING TEMPERATURE
LOWER CONTACT – THIS COMPLETES THE ELECTRIC CIRCUIT THROUGH THE STOCK

METAL GATHERING—Electrical resistance of the stock causes it to heat between the upper and lower contacts. A steady downward force on the stock makes the hot, soft metal flow outward, enlarging the cross section. As the cycle progresses, the upper contacts can be moved upward, providing clearance for added gathering.

Metal Gathering was used to produce the end mass for all of the parts at right.



FLOTRUSION—Contours on the mandrel are reproduced in the tube. Multiple tooling setups can produce a variety of outside and inside configurations on the same part.

The tail rotor blade (at right) for a helicopter (Hughes Tool Co., Aircraft Div.) is Flotruded from the raw stock. In sequence (top to bottom), part of the wall is reduced from 1/8 to 0.035 in. The heavy end then is gathered to produce the flange. The finished tube varies in wall thickness from 0.095 in. at the flange end to 0.035 in. in the center and 0.015 in. on the other end.

Here Are Two Shortcuts for Complex Parts

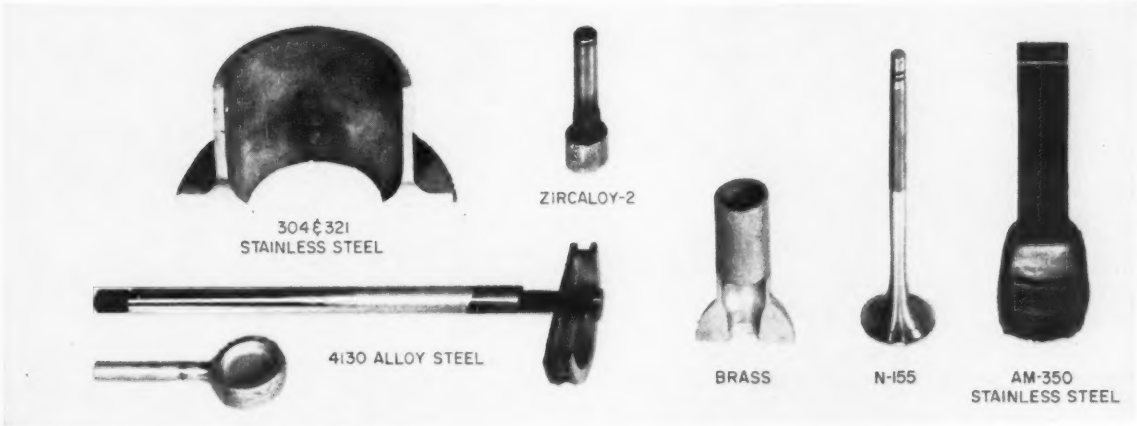
The proprietary processes extend the limits of hot upsetting and tube redrawing. Result: You can come up with improved, one-piece shapes

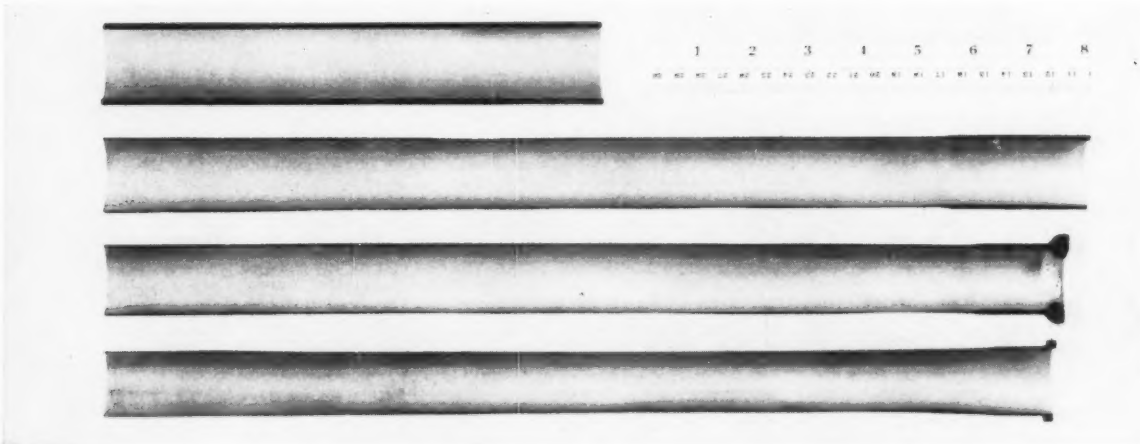
TWO PROCESSES used in a small plant outside Los Angeles may send your design engineers back to the drawing boards.

Both make it possible to come up with parts that may have been economically impractical to produce by any other manufacturing method.

That's the opinion of engineers at Tapco Group, West Coast Div., Thompson Ramo Wooldridge Inc., Bell, Calif. Working with Flotrusion and Metal Gathering, either separately or in combination, Thompson has turned out a wide variety of tubular parts, some showing considerable savings, others having improved physical properties.

to get parts like these





• **Metal Gathering**—This is a process for increasing tube wall thickness, or for building up the cross section of a solid bar in localized areas.

The end of the part blank is heated to forging temperature. Constant pressure (applied by a ram) forces the heated area to swell, gathering it into an integral heavy mass. On tubing, the gather forms both to the outside diameter and inside diameter.

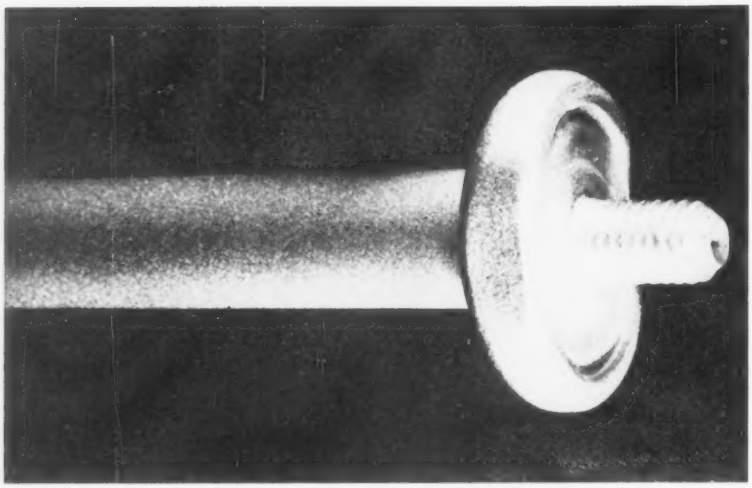
For most operations, a forging operation shapes the mass to the desired configuration. Forging is normally done immediately after the gathering, while the mass is still at working temperature. In some cases, the gather can be made in the middle of the tube or rod.

• **Departure**—Metal Gathering is an extension of metal upsetting. With upsetting, there is a limit to how much the rod diameter or tube wall thickness can be expanded without producing folds or laps. In Metal Gathering, the tube or rod is progressively gathered into the mass. The only limitation on the amount of tubing put into the mass is the size of the equipment.

The process was developed to put a mass on the end of a round rod from which an engine poppet valve could be forged. This application has accounted for sizable production in the plant for over 20 years.

In general, any metal that is forgeable can be Metal Gathered. Alloy and stainless steel parts have been produced in quantity. Considerable development and sample production work has been done with special alloys, including N-155, Hastelloy X, Inconel, 17-4 PH, AM-350, titanium, aluminum alloys, and Zircaloy-2.

• **Plusses**—Here are some advan-



The end of this tube (1020 steel, 5/8 in. OD, 0.120 in. wall) was gathered around a threaded stud to produce an integral threaded end

This is a missile launcher part for the Convair F-102. It's made of 4130 steel. The raw stock is at top. The center section is Flotruded from a 1/8 to a 0.035-in. wall. Then the heavy wall at each end is gathered into a mass and forged to produce the end fittings. After the fittings are machined, the bearing is pressed into place. At bottom is the tube as it used to be made—seven machined parts were welded into a single assembly. The new part is lighter and costs were slashed

tages of the process:

1. End fittings can be made integral with the tube or rod. No weldments or mechanical attachments are needed.
2. There's a minimum of machining required on the formed ends.
3. Often, no machining is needed on the center section of the tube, to reduce the wall thickness.
4. Grain flow of metal follows the contour of the gathered mass. It often means increased strength and fatigue resistance.
5. Heat treatment is facilitated since the whole part is made of the parent tube material.

• **Flotrusion** — The second process is a precision tube redraw operation. With the aid of special tooling, heavy wall tubing is drawn, cold, to produce variable wall parts. Heavy and light walls can be varied considerably in length and thickness, and either the outside diameter or inside diameter can be held constant (or varied) as required.

• **Limitations**—Nearly every process has some limitations—in the case of Metal Gathering and Flotrusion, limitations are generally imposed by the equipment, rather than the processes. Here they are.

Metal Gathering:

1. Tube diameters up to and including 8 in.
2. Tube cross-sectional areas up to and including 10 sq in.
3. Wall thicknesses down to 0.035 in., where the wall thickness-to-tube diameter ratio does not exceed 50 to 1.
4. Maximum lengths of 68 in., but consideration is being given to equipment that will handle unlimited lengths.

Flotrusion:

1. Diameters up to and including 7 in.
2. Lengths up to 13 ft. (In time, the limit may be extended to 40 ft.)
3. Wall thicknesses down to 0.010 in. and up to 3/8 in. have been produced. Wall thickness limitations depend on the configuration, but a heavy-wall to light-wall ratio of 6 to 1 is maximum.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Nuclear Study Furthered

Advancement in nuclear technology through better research facilities is promised by the installation of three vacuum melting furnaces and extensive controls at Rensselaer Polytechnic Institute, Troy, N. Y.

A forging press with 200 ton capacity will soon be added to study the effects of forging the metals and alloys which have been melted in the vacuum furnaces. Principal metals under consideration include uranium, zirconium, and other nuclear alloys.

The equipment was purchased largely through a grant of $54,000 from the U. S. Atomic Energy Commission and a grant of $8500 from the Rochester Div. of Consolidated Electrodynamics Corp. Installation and other costs will run the investment to $70,000 or more.

• **Furnace Types Vary**—The induction melting furnace made by Consolidated Electrodynamics can melt about 50 lb of metal in a high vacuum. The melting unit is contained in a water-cooled tank with a heavy glass porthole for observing the action.

The second largest furnace is a consumable electrode, vacuum arc unit made by the Heraeus Co., Hanau, Germany. It will melt ingots up to 6 in. in diameter.

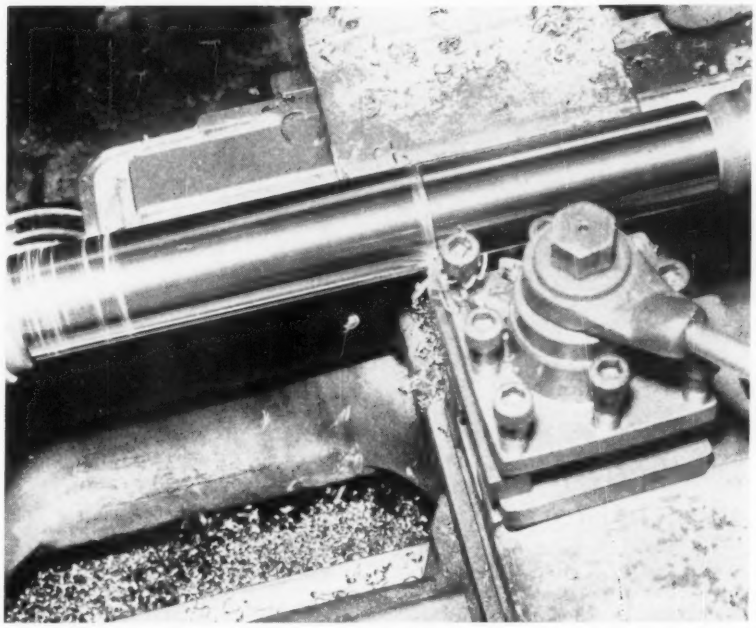
The third furnace is a bottom pouring type for vacuum induction melting of uranium and uranium alloys.

Steel Mix Programmed

Digital computers are slashing the time and expense of determining lowest material costs for stainless steel. They tell the steelmaker in about 5 minutes which combination of metal sources, oxygen, and lime gives minimum costs.

Used at Electro Metallurgical Co., Detroit, a division of Union Carbide Corp., the technique takes into consideration the price of various raw materials, such as scrap and ferroalloys, and the effect of various changes in steelmaking practice.

A Type 430 stainless heat has been programmed. The company says the method can be readily modified to include 300 and other 400 series steels.



Two cuts with improved cutting tool produce good finish in stainless steel

Faster Turning Solves Tough Stainless Problem

Increased feed and turning speeds, soluble cutting oil, throwaway toolholder with improved insert and negative rake angle save time and money in machining

AN IMPROVED toolholder using a small, throwaway insert was parlayed with unorthodox turning methods by tool engineers at Otis Engineering Co., Dallas, to increase production and decrease tool cost in machining 17-4 PH stainless steel.

R. A. Hasty, Otis production engineer, cites the need to treat each stainless steel machining problem separately, eschewing rules established in machining other metals.

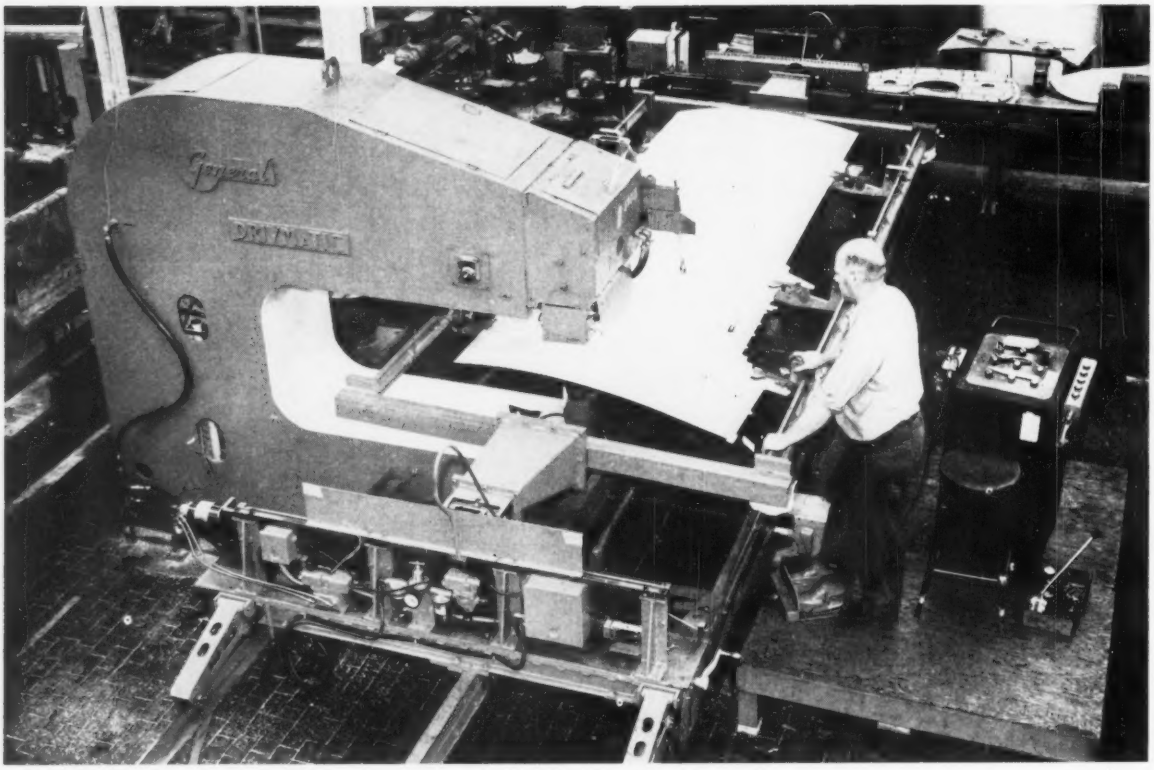
• **Machining Problems**—The unusual approach was taken to overcome extreme cutting pressures, intense heat at the tool and chip interface, abrasive tool wear, and cratering. Chip breaking and chip control were also serious problems.

Tool engineers from Otis and from Wesson Co., Detroit, developed a carbide cutting tool with high red hardness, and with resistance to wear, cratering, and pressure cracks. The partially ground insert actually takes on a honed finish during its first rough cut, and lasts five times as long as conventional tools.

• **New Methods Pay Off**—Ordinarily, a sulfur-base cutting oil is used to reduce excessive tool wear and cratering; Otis engineers flooded the cutting edge with soluble oil in a 20:1 ratio. Result: Improved cooling.

By using a negative rake angle, they found that tools withstood pressures better, provided chip control in both the rough and finish cuts. Feed speed was increased from 0.010 to 0.012 in. per revolution and turning speed was upped from 435 to 600 fpm.

The new tool and turning methods increased production 400 per cent. Tool cost for rough and finish turning of each piece was halved.



This machine replaces 80 per cent of each of these outer skin jobs . . .

How We Beat the Cost Crisis

Automatic Riveting Speeds Aircraft Wing Assembly

Over-all manhour savings on the job: 26.6 per cent. This is another of the top cost-cutting examples in STEEL's Cost Crisis Awards Competition. The final entry in the series will appear in next week's issue

PICTURE thousands of rivets in an aircraft wing panel spaced like rush hour commuters in a subway. Each rivet hole must be drilled and counterbored. After the panel is riveted, the fastener heads have to be milled flat.

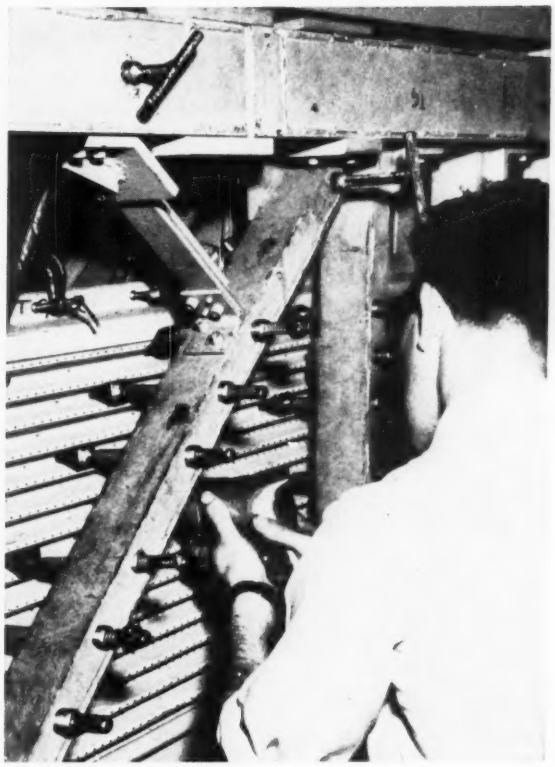
That's one of the jobs faced by most airframe fabricators, and makes for a production line snarl.

• **Solution** — The problem can be eased by improved riveting alone, say manufacturing engineers at Grumman Aircraft Engineering Corp.'s plant No. 3, Bethpage, N. Y.

Grumman's old production sequence went like this: Corrugated panel stiffeners first were hand drilled; then operators duplicated the hole pattern on the metal skins; skin holes were countersunk to take the rivet heads; the skin and corrugation were riveted together; finally, rivet heads were milled flush with the skin to provide an aerodynamic smoothness. All operations were done manually.

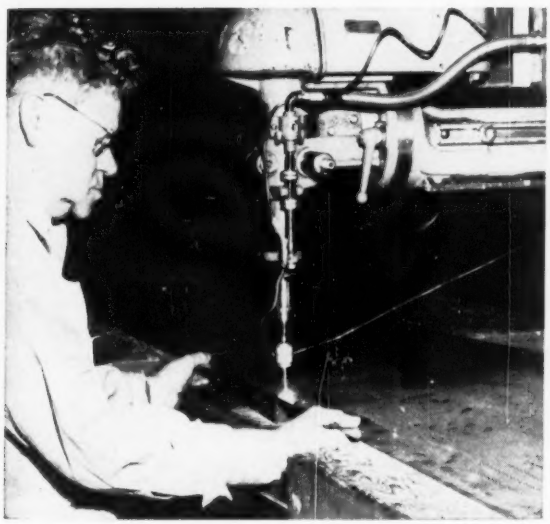
• **New Way**—Grumman now uses a tape-controlled riveting machine.

Hand Drilling Corrugations . . .

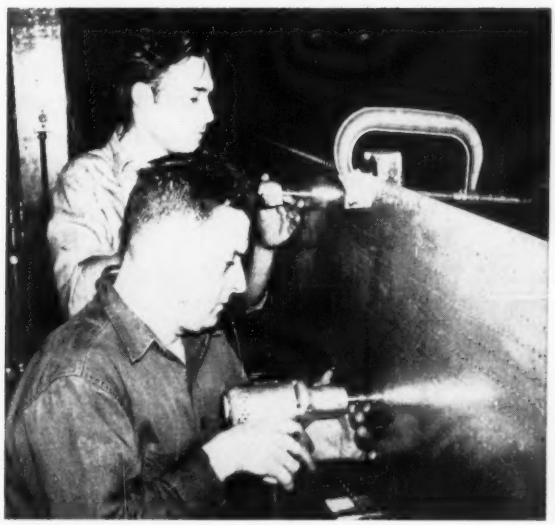


Hole Transfer . . .

Hand Countersinking . . .



Shaving Rivet Heads



Working from instructions preset on a punched paper tape, the machine positions the workpieces for each hole, drills through both the corrugation and skin, countersinks the skin hole, and drives the rivet—all in a continuous automatic cycle.

Hand processing still must be done on 20 per cent of the holes—they are used for tacking the skins and corrugations together prior to machine riveting. Since the machine controls countersunk depth to within 0.001 in., there's no need to mill rivet heads.

The change lopped 26.6 per cent off the time required to assemble a wing panel, says B. G. Lindgren of Grumman's Tooling & Methods Dept. Old time: 73¼ manhours. New time: 53¾ manhours.

Sealing Plastic Locks in Parts

YOU MAY be able to save money and eliminate press fits, lock bolts, and sleeve seals from your operations with a liquid plastic that hardens when confined between closely fitting metal parts.

Acme Road Machinery Co., Frankfort, N. Y., replaced a 9-in. spherical roller bearing in the jaw of a rock crusher in less than an hour and saved $155. It used to take three to four days to do this job. The bearing was mounted with a slip fit and retained with Loctite sealant. Former practice: An interference press fit.

To do the job now, Acme cleans the outside of the bearing and inside of the housing, roughens mating parts with emery paper, and applies the sealant. It hardens completely in 12 hours.

• **Other Jobs**—Loctite repairs loose bearings in a variety of equipment. A large west coast trucker uses it to retain main drive gear bearings in an aluminum transmission housing. They were formerly rebored and sleeved.

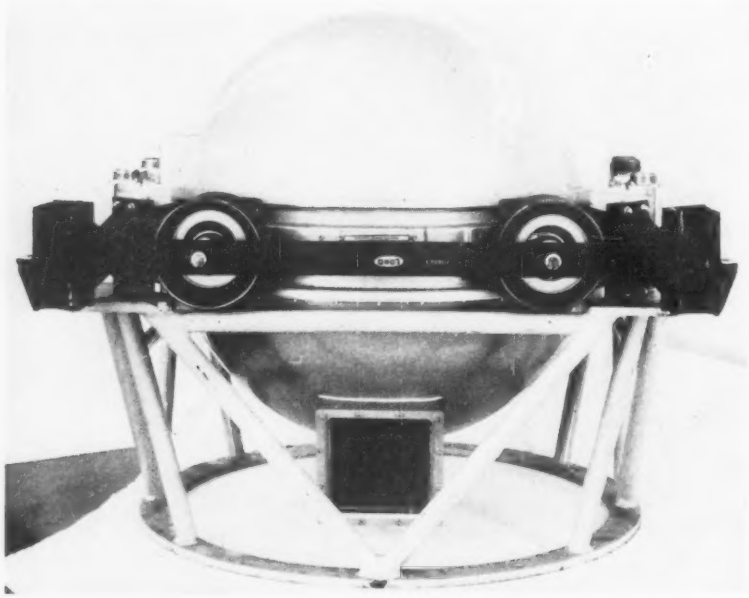
With the sealant, a coal company repairs 16-in. roller bearings on coal shakers. The Timken axle bearing of a switching locomotive was repaired using shim stock to take up the looseness caused by wear and Loctite to hold the bearing race and shim stock in place. Savings were $500.

• **Replaces Press Fits**—In production, the material replaces press fits, enabling the user to relax tolerances and reduce rejects and rework. Parker Sweeper Co. cut rejects from 8 per cent to less than 1 per cent on the gear box bearings of its Turbo Sweeper. Clearance has been set at 0.002 plus or minus 0.0015 in. and Loctite takes the place of a 0.0003 in. interference fit.

A manufacturer of power lawn mowers reclaimed 4000 aluminum castings that were bored 0.0025 in. oversize for a 0.0005 in. interference fit. Bearings were mounted with Loctite and this method has been continued in production.

Loctite hardens only when confined between metal parts. The metal surfaces, aided by the absence of air, do this by catalytic action. The joint is completely impregnated with plastic because the material hardens by polymerization, rather than evaporation of a solvent.

The material also locks nuts and bolts, seals threaded and sleeve joints against fluids under pressure, holds hardened sleeves on shafts, and mounts bushings without a press fit. It is made by American Sealants Co., Hartford, Conn.



Two magnesium hemispheres used in Arma's inertial guidance system

Magnesium Speeds Missile

Magnesium enclosures for guidance system reduce dead weight, missile fuel consumption; meet requirements for thermal shock and vibration resistance

MAKERS of missile guidance systems faced this problem: How to reduce weight, increase power-to-weight ratio without sacrificing strength.

Solution: Use of magnesium components wherever possible.

An ICBM inertial guidance system, reportedly the lightest of its type, has been developed by the Arma Div. of American Bosch Arma Corp., Garden City, N. Y. It is housed in three magnesium enclosures to eliminate dead weight and reduce fuel requirements.

• **How It Helps Arma** — Two enclosures used in the Arma system, the three-deck computer section and the control-central cases, are fabricated entirely from magnesium extrusions, while the third, the inertial platform, consists of two deep-drawn magnesium hemispheres.

Large sections of extrusions are machined out, reducing weight to a minimum.

Magnesium components also meet the Arma system's requirements for resistance to thermal shock and vibration.

Computer and control-central cases are supplied by the Bay City (Mich.) Div. of Dow Chemical Co. and by American Machine & Foundry Co., Buffalo. Aero Trades, Mineola, N. Y., supplies magnesium hemispheres for the platform.

Master mechanics like the Wean "Flying Press" as much as presidents do

The Wean "Flying Press" does one thing extremely well: it produces stamped parts at absurdly low costs per piece. This pleases management because the cost reduction it makes possible helps widen the profit spread in finished products.

To find the reason for the master mechanic's satisfaction, we must examine the operating characteristics of the "Flying Press," a difficult job to do in print. First, the "Flying Press" is completely unique among stamping presses, producing parts from coil without stop-and-go indexing at the press. But, far from making the equipment *more* difficult to operate, this "Flying Press" principle eliminates the use of clutch, brake and fly-wheel; all points of potential press break-down! And there's less danger of die breakage with the "Flying Press," both during set-up and operation, since automatic devices to protect the tooling are built-in.

We could go on with a list of many other advantages which the Wean "Flying Press" offers over ordinary designs, but there's just too much to cover. However, we have summarized the general points of superiority in a booklet which we'll gladly send you. If you'd prefer, one of our sales engineers will be glad to discuss the "Flying Press" in regard to your specific production at your convenience.

May we hear from you, to send the booklet or call?

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WEAN EQUIPMENT CORPORATION

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Typical reactor forgings produced by Bethlehem Steel Co. To prevent flaking in the heavy sections, Bethlehem developed a new steel analysis

Material Solves Problems In Forging Reactor Parts

Bethlehem's composition for heavy forged sections is equal in tensile, impact strength, and weldability to ASME Boiler Code analysis SA 302 but does not flake

PRODUCTION of forgings for atomic reactor pressure vessels has challenged the skill and equipment of the forging industry.

The problems associated with forging heavy walled components had to be solved while the reactor pressure vessel forgings were in commercial production.

The manufacture of forged vessels for high-pressure service in the chemical industry is a common, although specialized, process. The manufacture of the conventional, low pressure vessel for use in steam generation is also common practice. (Fabricated plates are welded.) The two processes are combined in the manufacture of the atomic pressure vessels because of their great size and special design. They incorporate large, heavy forgings.

• **Used SA 302 Analysis** — It was natural that designers and fabricators should write the specifications for the forgings by translating directly from their experience with plate material for ordinary boiler installations.

That analysis, the ASME Boiler Code composition, is nominally a low carbon steel with 1.30 per cent manganese and 0.5 per cent molybdenum. The high impact properties of the analysis, with aluminum addition in relatively light sections such as plates, were attractive to the designers.

To further improve the impact strength, an addition of 0.40 to 0.80 per cent nickel was specified, and the SA 302 modified analysis, aluminum deoxidized, was adopted as the specifications for the forgings.

• **Specs Caused Trouble** — The problems of manufacturing massive forgings differ radically from those of plate manufacture. The forging industry as well as pressure vessel designers were particularly concerned by these four points in the proposed specifications:

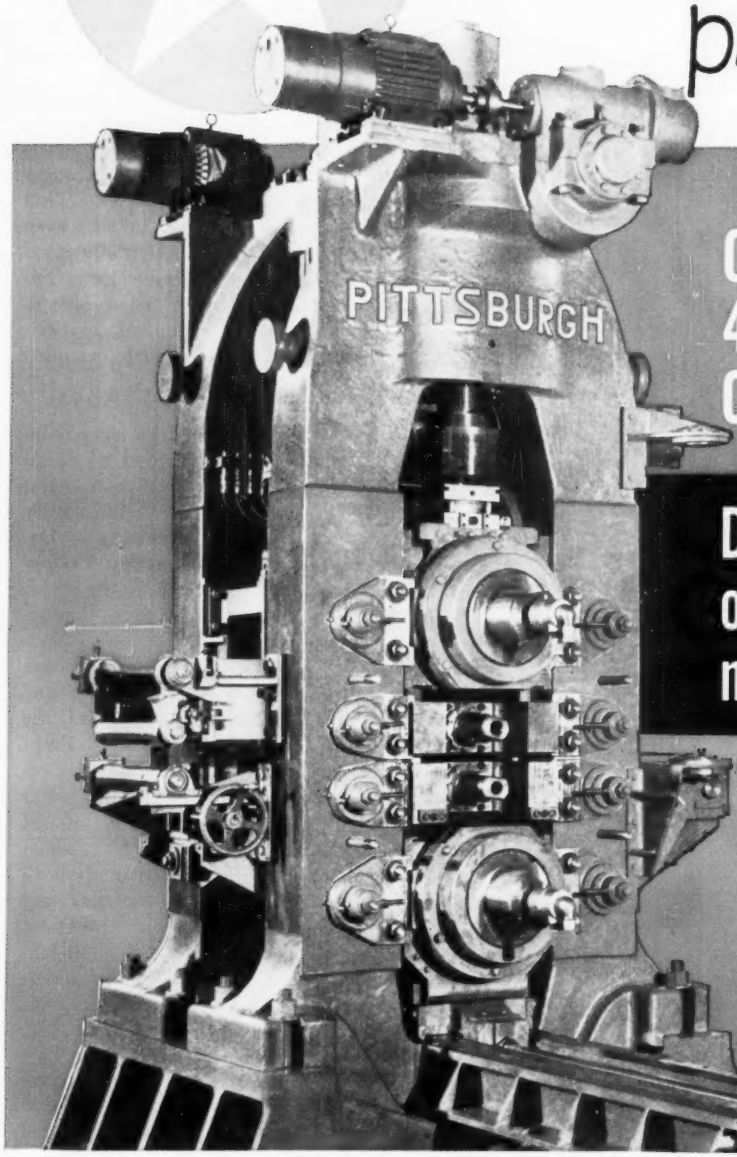
1. The composition called for a high manganese-molybdenum steel. (High manganese is troublesome in large forgings.)
2. The steel required deoxidation with aluminum. (Aluminum is undesirable in heavy forgings.)
3. The forgings had to be liquid quenched. (Liquid quenching of massive forgings of varying cross sections is exceedingly hazardous.)
4. Impact properties had to be high and the transition temperature low. (Those properties, although easily attained in light sections such as plates, present real problems in heavy sections of the large forgings.)

• **Rejections Were High**—Because the atomic program had to proceed according to schedule, sound forgings had to be made available at once. Production was started at the Bethlehem plant of Bethlehem Steel Co. on the initial orders for reactor pressure vessel forgings.

Satisfactory forgings were made —but at an exorbitant cost. The rate of rejection was alarmingly high—so high that only the ur-

PITTSBURGH

presents—



Combination 4 High /2 High Cold Mill...

Does the work of two separate mills

"Precision" and "Versatility" are the words that best describe the new combination 2 High/4 High Cold Mill designed and built by PITTSBURGH to secure precision gauge, temper and finish for the ferrous and non-ferrous industries. As a 4 High Mill, it is used for cold reducing; as a 2 High Mill, it is used to acquire the desired temper and finish. Several desirable design features are incorporated to keep roll change time to a minimum. Low initial cost and economical operation are attractive plus values.

Heavy Machining Facilities

Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

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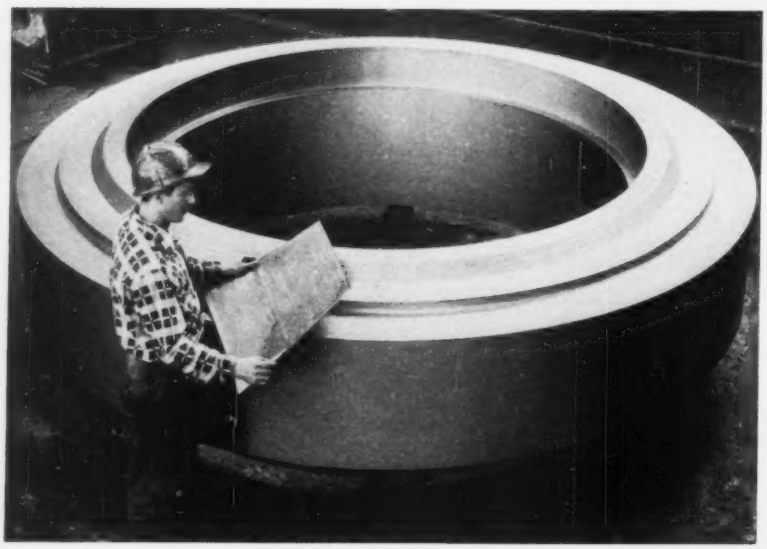
PLANT AT GLASSPORT, PENNSYLVANIA

Above and below are more forgings for nuclear reactors produced by Bethlehem from Specification SA 336 steel composition. The material has tensile and impact properties equal to the ASME Boiler Code composition, SA 302, and good weldability. Flaking, a problem with SA 302, has been eliminated



gency of the situation justified continuance of the program.

Something had to be done, and in a hurry, to eliminate the losses of materials and time, or at least to keep them within reasonable bounds. Investigation of the condemned pieces substantiated the opinion that the SA 302 analysis was abnormally susceptible to "flaking" (internal fissures) in the heavy section involved.

• **Some Improvement Obtained**—Generally, flaking problems may be minimized by the use of longer thermal conditioning cycles. That was the first step taken, even though the cycles originally used were considered adequate for standard alloy forging compositions. While some improvement was evident, the results of such extended treatment cycles were still not satisfactory.

At the same time, the use of aluminum was discontinued. Again some improvement was noted. But it became apparent that the atomic reactor pressure vessels program depended on the immediate development of a new composition which would insure continuous production of sound forgings.

With the co-operation of the prime contractors, fabricators, and the Naval Reactor Branch of the Atomic Energy Commission, Bethlehem undertook a crash program to develop a composition better adapted to the manufacture of heavy forgings, and at least equal to the SA 302 modified analysis in tensile and impact properties and in weldability. The program, which involved testing of small laboratory heats as well as the manufacture of production forgings, was completed in four months.

• **New Analysis Found**—A composition was developed which produced material equal in the desired characteristics of tensile and impact properties and weldability and provided assurance against condemnation of forgings with the tremendous loss of time it caused.

The nominal analysis of the new compositon: 0.20 per cent carbon; 0.65 manganese; 0.70 nickel; 0.35 chromium; and 0.60 molybdenum.

• **Has Desired Properties**—Weld-

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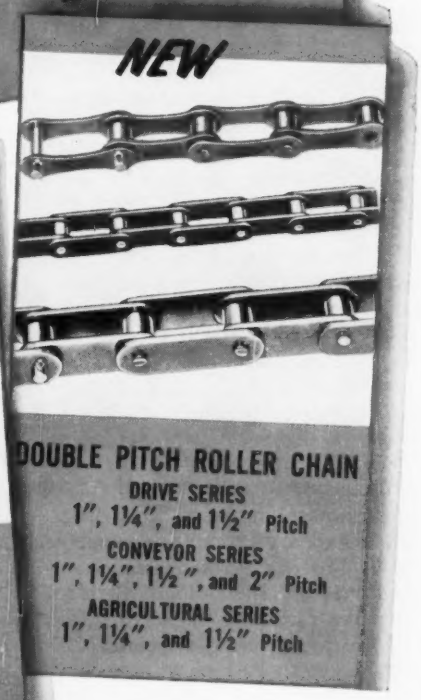

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ability tests conducted in plants of fabricators proved the analysis was equal in all respects to the former composition. Tensile and impact properties were equal to those of the original SA 302 modified analysis.

With that background, the grade was presented to the ASME Boiler Code Committee under Case 1236, and, with their co-operation, the composition was approved under Specification SA 336.

Techniques which had been worked out for liquid quenching the forgings and for machining close to final contour before quenching to obtain the desired properties at the most highly stressed locations were found to be adaptable to the new composition.

• **Flaking Problems Gone**—Production was started on the new analysis. To date, more than 50 have been produced at Bethlehem without a rejection due to flaking.

Their properties have been more than comparable to those of the earlier analysis, and fabricators have indicated that the weldability of the new composition is equivalent to the former. The performance on forgings produced without delays and with only normal rejections has justified the use of the new composition for production of atomic reactor pressure vessels. It is now available to all producers.

• **Bethlehem Is Supplier** — In the present naval program, Bethlehem has played a major role in supplying forgings for atomic reactor pressure vessels. In addition, Bethlehem has furnished the forging for the reactor pressure vessel of the Shippingport (Pa.) plant—the first commercial power generating installation in the U. S.

Although this work is now carried along on a regular operating schedule, it is far from routine. It is still a highly specialized operation requiring the most careful attention in every phase.

New compositions and new techniques have not been the only requirements for making volume production possible. Additional large machine tools have been provided so that the atomic reactor program can proceed without delay.

Automatic Tool Changers Strike at Downtime

By choosing the right tool for the job, and then using it, several new machines are spending more time cutting, less time standing still

YOU are about to be offered another weapon (automatic tool change) to fight costly machine downtime. It is tailored to machining jobs where multiple operations (with several sets of tools) must be done on a single machine.

Case History: A year ago, production men at IBM's Endicott, N. Y., plant told about a jig borer they were using that automatically (following punched card instructions) chose 1 of 30 or more tools for a specific job or operation. (STEEL, Dec. 16, 1957, p. 119.)

Built by Fosdick Machine Tool Co., Cincinnati, the machine picked tools from a disc, automatically put them in the spindle, then returned them to the disc when the job was done.

• **In-Line Station**—Early this year, Hughes Aircraft Co., announced an all-tape-controlled transfer line (STEEL, Mar. 31, p. 84) that featured a 20 tool drum magazine at the horizontal drilling station. Here again, the machine "listened" to numerical control instructions, selected the right tool for the job, and returned it to storage when the job was done.

• **To Market**—Both the IBM and the Hughes machines were specially built to handle a series of jobs. Now, Kearney & Trecker Corp., Milwaukee, has packaged the concept in a new machine which is ready for market. K&T, builder of the much discussed Hughes line, used the same principles on the new Milwaukee-Matic.

Costing about $120,000, the combination machine can be set up to mill, drill, ream, tap, and bore workpieces. The designers estimate it will replace from three to eight individual machine tools in some production lines. All the machine functions, including selecting from the 31 tools stored in the drum, are controlled by punched tape.

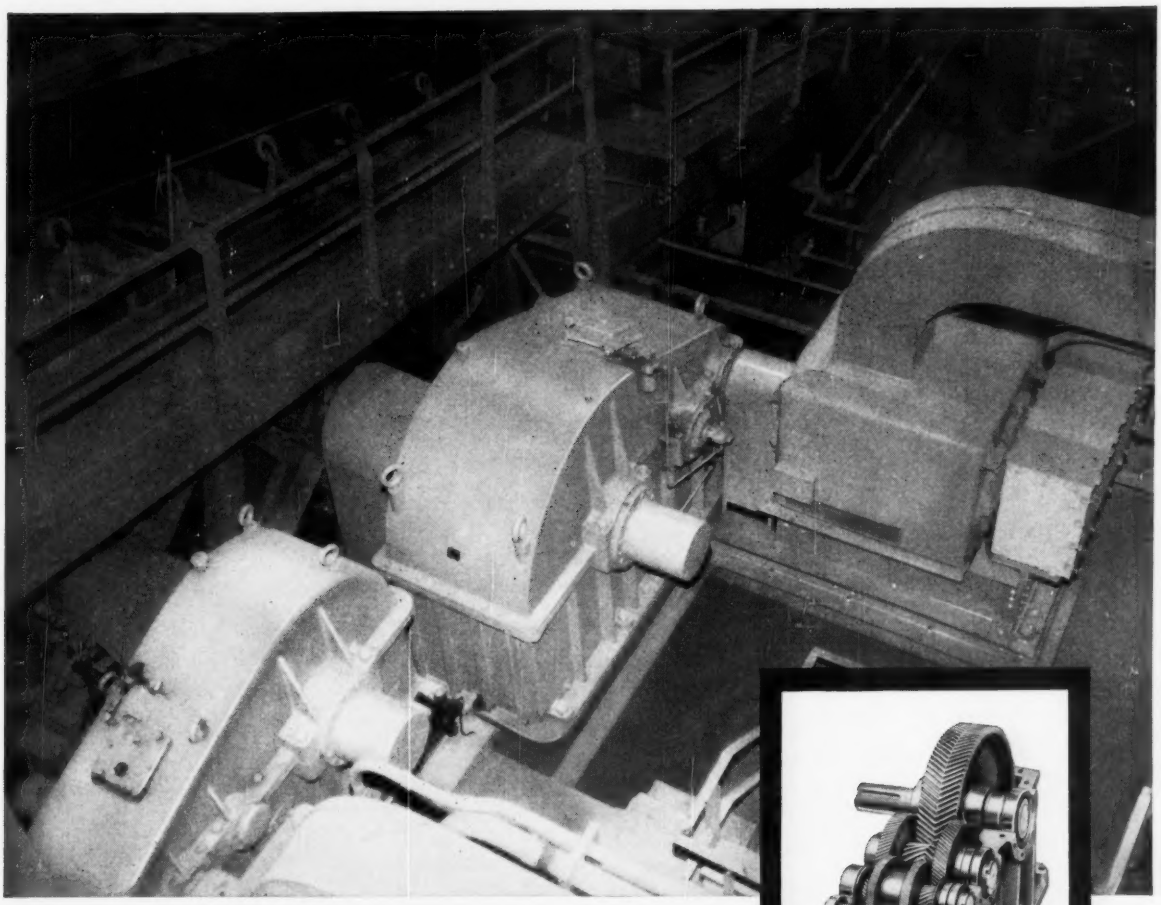
• **What It Means**—This trend toward trimming downtime by speeding up tool change, part loading and unloading, and gaging is bound to continue. Although these developments may be less spectacular than some of the drastic tries at cutting (like supersonic and even the suggested nuclear machining), they may well be more important. Many studies show that a majority of a machine's cycle time is spent on something other than cutting. This, then, is the most likely area for immediate cost cutting potential.

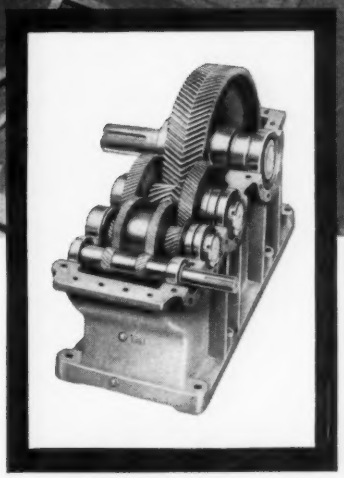
Association Moving

Evidence of industry's need for liaison with government: Headquarters of the National Machine Tool Builders' Association soon will be moved from Cleveland to Washington. The move is to be completed during 1959.

Foreign Threat

Machine tool builders see no chance to improve their foreign markets in the next two or three years. Early returns on a STEEL survey show that most builders see their exports waning in both 1959 and 1960. The biggest reason: The European common market. You can expect continued expansion of U. S. machine tool capacity abroad, as builders fight to stay in the foreign markets.





PHILADELPHIA REDUCERS ARE HEAVY DUTY "PLUS"...

and the big jobs prove it!

The big jobs, like these 1,500,000 inch-lb. output torque units in a taconite processing plant, are the ones that demand the extra "plus" in reliability and performance of Philadelphia Parallel Shaft Reducers.

In reliability, Philadelphia Reducers are the "heavies" of the heavy duty drives, with extra strength built into every part. Housings are reinforced at points of greatest stress. Bearings are extra heavy to take severe and repeated shock loads . . . handle heavy overhung loads. Shaft alignment is accurate, and shafts have that extra "heft" that keeps them running true.

In performance, these reducers have no equal. Gearing is designed to the needs of each application and symmetrically arranged in the housing. Hence, bearings on each shaft carry equal loads, shaft deflections are minimized, bearings and gearing have higher shock load capacity.

In value, a Philadelphia drive assures long rugged life and freedom from dollar-eating maintenance problems. Pound for pound, horsepower for horsepower, dollar for dollar you can't buy a reducer that will outlast a Philadelphia.

Philadelphia Parallel Shaft Reducers are available in single, double and triple reductions for ratios of 1.25:1 to 292:1. Write today for your copy of catalog H-58.

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Torch throwing molten tungsten at 10,000 mph

Plasma Arc Tames Tough Metals

Forcing argon to flow through an arc creates temperature that will melt anything, says Linde. By using its new torch, parts can be formed from materials that melt at 7500° F

PLASMA ARC torches may be another breakthrough in metalworking.

Generating temperatures up to 100,000° F, they will melt anything (if it won't decompose) and deposit the material on a mold. They can coat plastic, graphite, or metals.

The deposits are dense, can be finished to less than 10 microinches rms, and bond tighter to a base than an electroplating. Hard tungsten carbide is just as easy to handle as soft aluminum. Metals can be laid over nonmetals and you can put on as many layers as you like. Dimensions of parts made that way are accurate to within 0.002 in.

• **There Are Two Types** — The maker, Linde Co., a division of Union Carbide Corp., New York, says its version quickly and accurately mass produces parts from materials so hard and brittle they can't be handled any other way.

The key to the method is a constricting nozzle on the torch. The electrode is in the center of the nozzle opening. Argon is forced through the nozzle and arc around 40 cfh. That ionizes the gas and carries the arc with it.

In one type (nontransferred), the arc ends at the nozzle opening allowing the hot gases to pass on to the work. Principal use is plating. The other type (transferred) permits both arc and hot gas to strike the work as in high speed metal cutting. (The principle is used in Heliarc cutting.)

Materials for melting and plating can be introduced as wire or

powder may be substituted.

• **What It Handles**—You can plate with tungsten, tantalum, molybdenum, columbium, rhenium, hafnium, thorium, and zirconium; in some cases, it will handle boride and carbide combinations of those metals.

To make a part out of tungsten, Linde deposits a coating on a brass or aluminum form rotated in a lathe. Coating particles traveling 10,000 mph build up to whatever thickness is needed. The deposit is 95 per cent dense and will rupture at 44,000 psi.

A chemical bath removes the brass or aluminum form and the remaining shell is fired in an inert atmosphere for 2 hours at 2550° F. That increases density to 98 per cent and rupture strength to 57,000 psi. Shrinkage runs between 0.7 and 2.2 per cent (low, compared with other tungsten forming processes). Finished parts can be ground or cut to size with abrasive wheels.

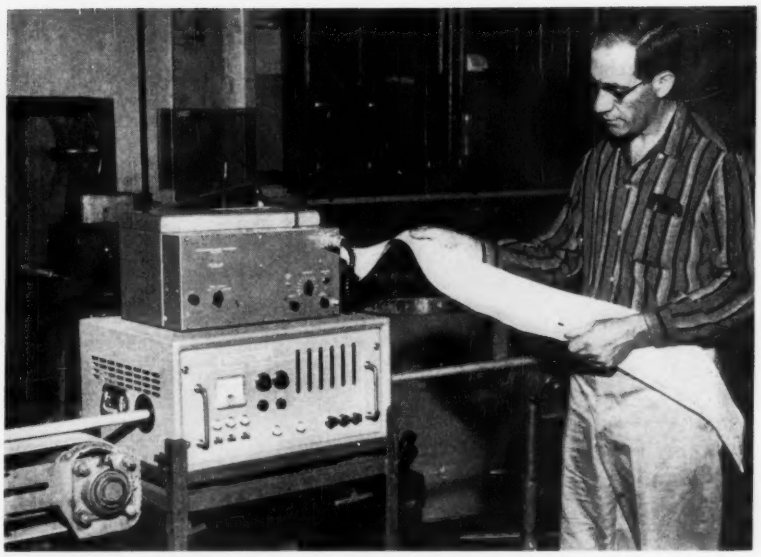
• **Availability**—Linde plans to put its new torch on devices with automatic feeds, tracer heads, and similar mass production equipment. Meanwhile, you won't be able to buy the torches, but you can take your projects to Linde on a job shop basis.

Costs: They're determined by the complexity of the part, the quantity, and the kind of contour control you want. In general, flame plated part costs are similar.

• **Applications** — Using plasma arcs, Linde makes nozzles and jet vanes for missiles. They withstand flame temperatures of 5500° F, the chemically active byproducts, and solid particles in rocket exhausts. Coatings on graphite of tungsten - zirconia, tungsten - rhenium, and extremely pure zirconium diboride look promising.

Missile researchers use the plasma arc principle to study the problems of re-entry. Various materials shaped into nose cones can be checked out by the device. Comparison of results gives some idea of the relative merits of each material.

Linde has also produced high density crucibles for laboratory work.



This eddy-current tester sounds a horn and flashes a light on finding defects in a piece of tubing, makes permanent chart record of each test

Tubing Tested Electronically

Device finds flaws much faster than any inspection equipment previously used; it is extremely sensitive to defects, but ignores straightening stresses

HERE'S one way to assure top quality in welded, stainless steel tubing: Use electronic testing equipment that gives visible and audible signals when it finds defects.

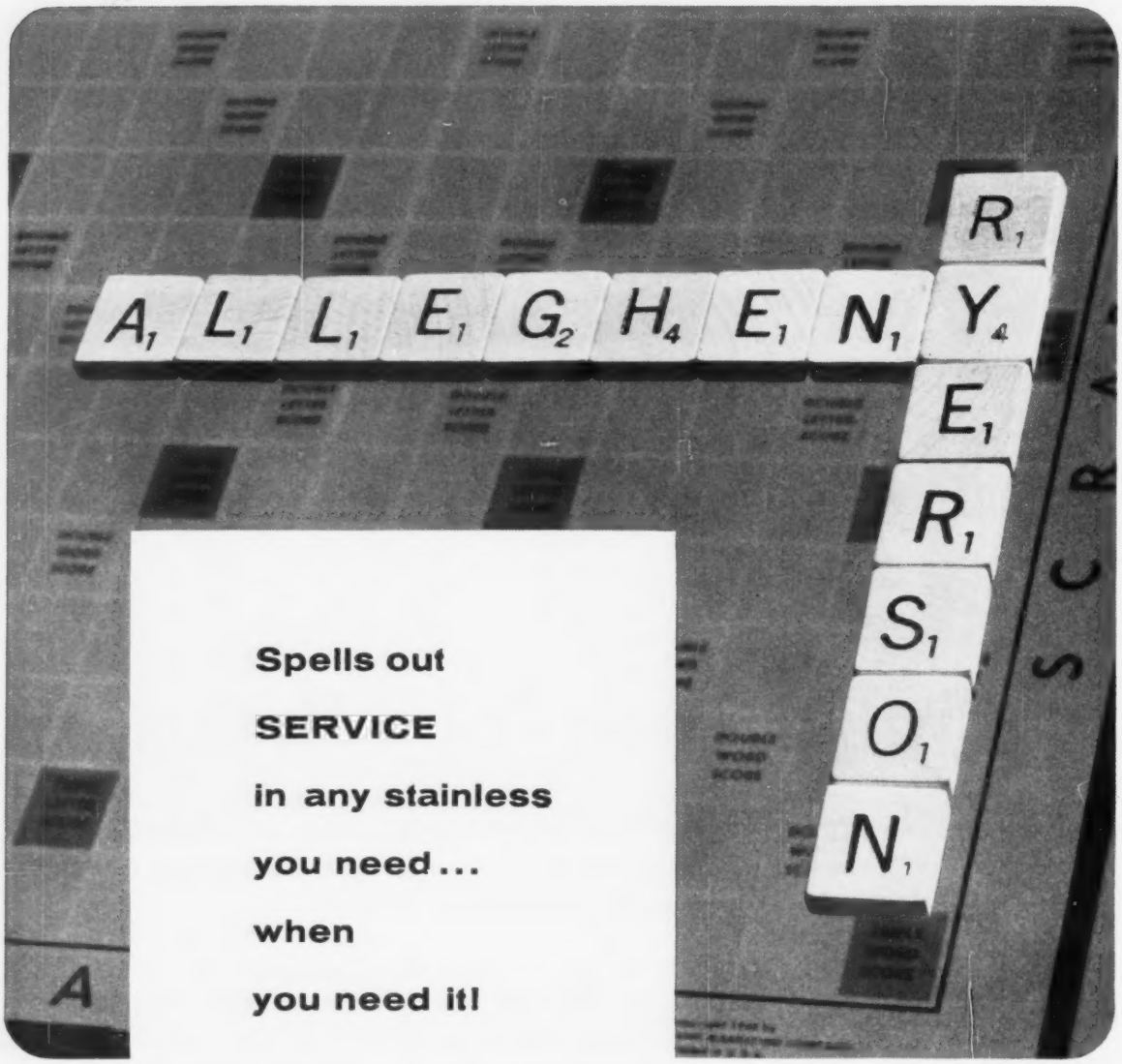
Wallingford Steel Co., Wallingford, Conn., a subsidiary of Allegheny Ludlum Steel Corp., has installed an eddy-current tester which beeps, flashes a light, and marks the tube with ink when a defect is located. It also makes a permanent record (about 7/8 in. of chart for each 26-ft length).

• **Cleaning Problem**—The big condensers at the Rivesville, W. Va. plant of the Monongahela Power Co. must be cleaned periodically to remove sludge. During the cleaning operation brushes are sent through the long condenser tubes. Unless the tubes are unusually straight, and without dents or other imperfections, brushes will stick in the tubes or fail to remove all sludge.

• **Saves Inspection Time**—Wallingford engineers saw the need for a fast, dependable testing method to check almost 250,000 ft of tubing to be used in the Rivesville plant. The eddy-current tester, faster than any inspection equipment previously used at Wallingford (tubing moves through the sensing coils at about 60 fpm), is sensitive to defects, but skips over straightening stresses in the tubing.

• **How It's Calibrated**—The equipment is set up for testing by running a length of tubing through the sensing coils. If no defect is recorded, a drill hole (0.040 in. in diameter) and a file mark are made in the tube. The equipment is then set to detect those marks.

Experience**—the extra alloy in **Allegheny Stainless



You can win only when you buy Allegheny Stainless from Ryerson. Two top names are teamed to give you quality stainless, the fastest way possible!

Allegheny Ludlum is the leading producer of stainless steels in all forms. Ryerson is recognized as the top steel service center. It's a team to bring you the best quality stainless, quick, when you need it.

Ryerson now stocks 2,351 shapes, sizes, finishes and alloys of Allegheny Stainless. It's the most complete line of stainless anywhere! And Ryerson takes the inventory cost from you, gives you as quick service as your own stockroom.

Whether your order is for Allegheny Stainless sheet, plates, bars, or whatever, Ryerson has it in stock. Trained salesmen and technicians to help in selecting or in fabricating are at your beck and call.

For top quality Allegheny Stainless from warehouse stocks, call Ryerson. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

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EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Tape System Slashes Programming Costs

MAGNETIC TAPE control is now within reach of the small budget. A machine control system, called Micro-Path, can be programmed without expensive computer techniques and equipment.

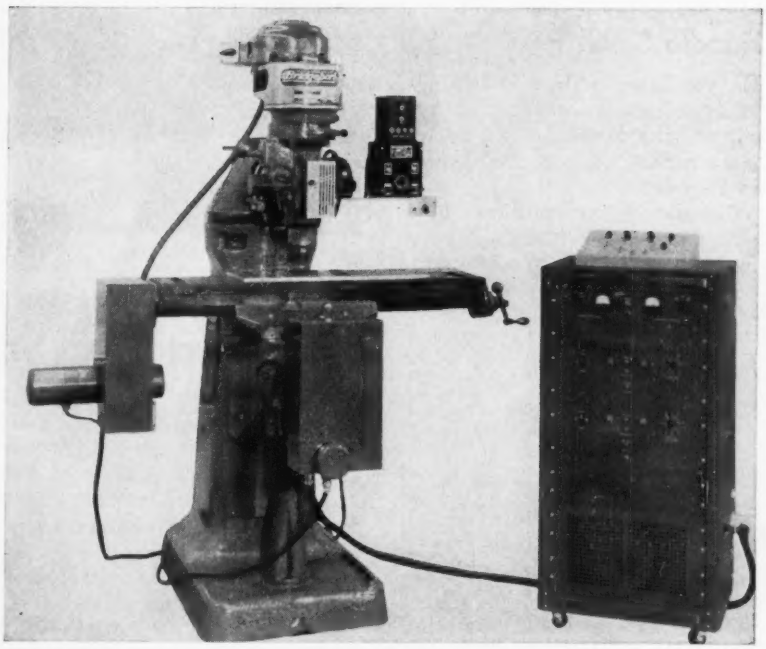
The manufacturer, Micro-Path Inc., claims cost savings over manual production methods of 85 per cent or more. (Ninety hours of machining time were saved in producing 179 mounting plates. A cam that would have taken 14 hours by manual methods was machined in 18 minutes.)

• **Programming Simplified**—Micro-Path is a dual-purpose system. The machine on which it is installed can serve as the programmer. For continuous path programming, it utilizes a stylus and special head in place of the usual cutter. Any path through which the machine slides are moved will be duplicated on playback of the magnetic tape.

Recordings can also be made on a special unit that is independent of the machine. Draftsmen or skilled machine operators quickly develop full competency in programming the system.

Complicated repetitive operations, such as the production of multiple die cavities, are simplified by making one recording for a single cavity. By automatic rewind and work advance, other cavities are duplicated in the same mold.

• **Ready Adaptability**—Micro-Path may be purchased in several combinations since the units are offered in modular form. Pulservo units (pulse-operated servomotors which are controlled directly by the pulses read from magnetic tape) may be adapted to present tools, or the system may be procured as a self-contained automatic positioning table. The system (programming and control) costs between $15,000 and $25,000.



Micro-Path system installed on a Bridgeport milling machine

It can be programmed to combine such operations as curved contour milling, hole drilling, and boring with straight-line milling.

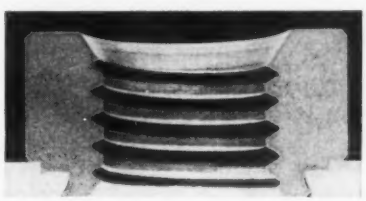
For more information, *write* Micro-Path Inc., a division of Topp Industries Inc., 4949 W. 104th St., Inglewood, Calif.

You Can Use Self-Swaging Nuts in Thin Sheet Metal

PUTTING load-bearing threads into thin (0.020 in.) sheet metal is no problem if you use a new self-swaging nut developed by Standard Pressed Steel Co.

Installation pressures in steel, brass, Monel, aluminum, and similar metals are as much as 50 per cent lower than with comparable nuts, claims the manufacturer. The nuts are strong enough to break 160,000 psi bolts before they fail. They are mounted flush on the load side of the nut and do not functionally deform, bend, or discolor the sheet metal.

The cylindrical SPS nut has an annular swage ring that drops into a hole stamped or drilled in the sheet. Nut and metal are squeezed



between parallel plates to flow metal into the neck of the nut. Knurls in the swage ring provide

resistance to torque-out.

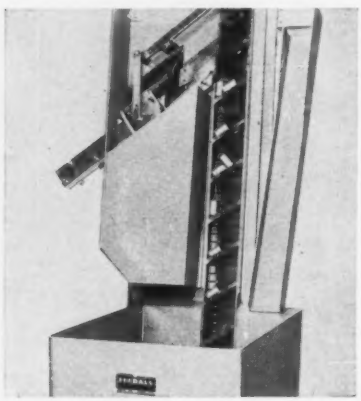
Most hydraulic or pneumatic presses with pressure control, including rivet setters, can be used for installation. *Write* Standard Pressed Steel Co., Jenkintown, Pa.

Feeder Will Help You Handle Small Parts

DO you have a problem in feeding a variety of small parts to your machines? The solution might be the latest high-speed part feeder made by Feedall Inc.

Completely automatic, it feeds sliding parts $\frac{1}{8}$ to 1 in. in diameter from $\frac{1}{2}$ to 3 in. long and rolling parts $\frac{3}{8}$ to 3 in. in diameter and $\frac{1}{8}$ to 1 in. thick.

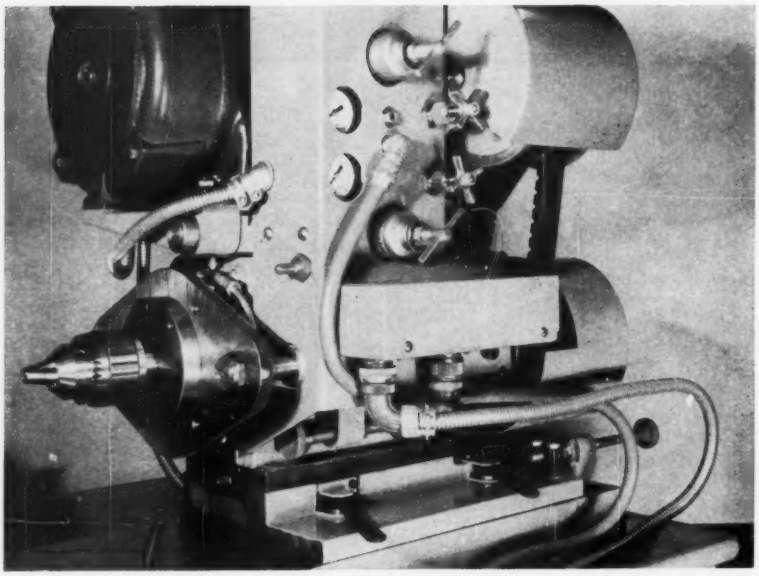
The Model 2200-C has a 6 cu ft hopper and a 6 in. belt.



For more information, *write* Feedall Inc., 38399 Pelton Rd., Willoughby, Ohio.

Electrode Aids Welding Of Manganese Steels

Here's an electrode that may help you trim welding costs on 12 to 14 per cent manganese steels. Called Mangjet, the low hydrogen, iron powder electrode can be used with both alternating and direct current welding. The manufacturer says it also can be used for building up hard surfacing deposits on either manganese or carbon steels. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.



Need a Versatile Drill Unit?

HERE's a tool that you'll get a lot of mileage out of—especially if you do a great deal of single point tool hollow milling, end forming, pointing, chamfering, drilling, and tapping.

It's the Beco Model 505 automatic drill unit that offers 600 to 12,000 rpm spindle speeds with stepless adjustment.

The chuck has a $\frac{1}{2}$ in. capacity; stroke is up to $1\frac{1}{2}$ in., with repeat on hole depth within plus or minus 0.002 in. Thrust is up to 980 lb using 100 psi air.

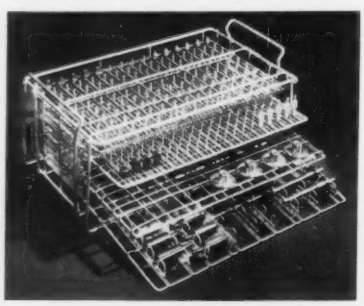
Attachments are available to control drill breakthrough, for self-reversing tapping, to detect and stop the unit when tools break, and for interrupted infeed to withdraw chips when drilling deep holes.

For more information, *write* Batchelder Engineering Co. Inc., 125 Main St., Springfield, Vt.

Basket Shelves Separate

The Multi-Shelf Carryer, a wire basket for handling precision parts, has wire shelves or trays that are removable. The units protect the surfaces of small parts during handling, processing, storage, and assembly.

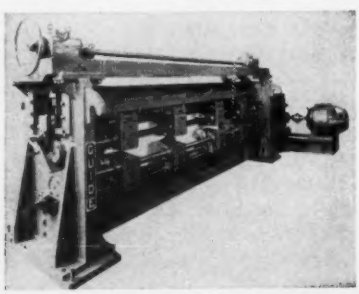
Shelves are replaced, the baskets continuing in use. *Write*: Mid-West Wire Products Co. Inc., 2555 Fenkell Ave., Detroit 38, Mich. *Phone*: University 3-4200



Slitter Is Arborless

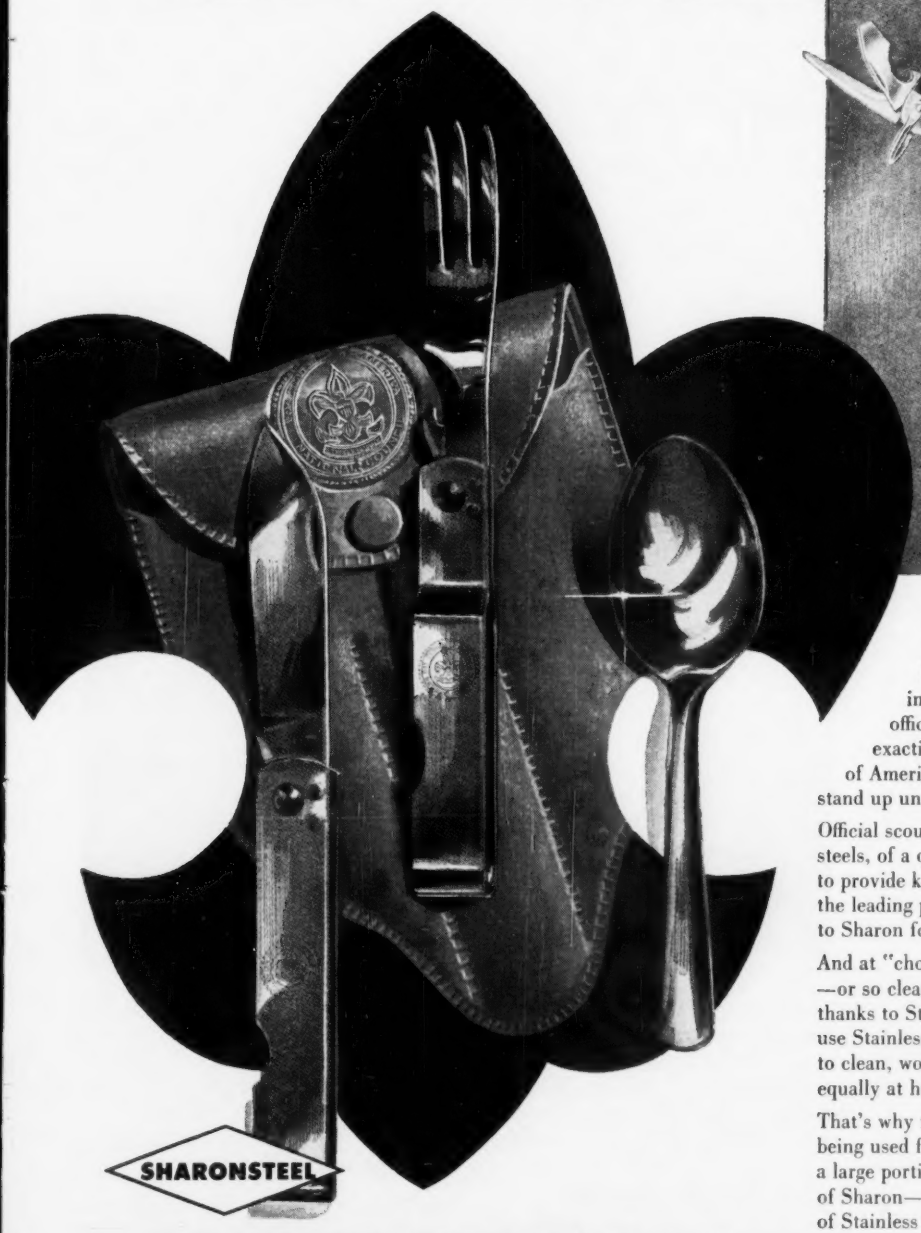
The Model AS-144-1 arborless slitter eliminates the many tool-steel spacers that are stored for conventional machines.

The unit has a simplified method



On the trail or in the home
Scouts are always prepared
–with fine cutlery made of

SHARON STAINLESS AND CARBON STEELS



Nearly five million scouts and their leaders enjoy the fun, adventure and inspiration of scouting. Their official equipment, all made to the exacting specifications of the Boy Scouts of America is of the finest—it has to be to stand up under rough, tough service.

Official scout knives are made of fine carbon steels, of a quality and uniformity warranted to provide keen, long lasting edges. That's why the leading producer of official knives looks to Sharon for its steel supplies.

And at "chow time", scouts never had it so good —or so clean! In every climate, the year round, thanks to Stainless Steel, millions of scouts use Stainless Steel eating gear because it is easy to clean, won't rust or white corrode, and it's equally at home indoors or out.

That's why more and more Stainless Steel is being used for scouting and camping equipment— a large portion of which comes from the mills of Sharon—one of the nation's leading producers of Stainless Steels.

THE FINEST CUTLERY IN THE WORLD IS 'MADE IN AMERICA'

SHARON STEEL CORP.

SHARON, PENNSYLVANIA

CHICAGO • CINCINNATI • CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE
NEW YORK • PHILADELPHIA • ROCHESTER • SHARON • SEATTLE • SAN FRANCISCO • WASHINGTON, D.C. • TORONTO • MONTREAL

of adjusting the knife setting that does away with shimming and fitting. Deflection is reduced to a minimum. *Write*: Guide Co., Canfield, Ohio. *Phone*: Lenox 3-5566

Unit Gages and Records

The Model AG air gage permits accurate measurement to one-millionth of an inch. It can check inside diameters or dimensions, outside diameters or dimensions, and center distances of holes—regardless of hole size.

Roundness of outside and inside diameters and blind holes on small precision parts can also be checked.

If a permanent record is required, an electric recording unit may be added to the gage. *Write*: B. C. Ames Co., Waltham, Mass. *Phone*: Twinbrook 3-8956

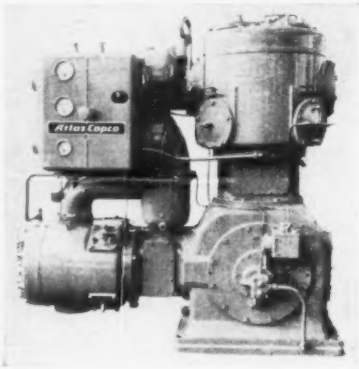
Bearing Provides Savings

Iron Oilite 212 bearings can be used on a wide range of products where corrosion is not a problem and mechanical strength requirements are within tolerable limits. They are made chiefly from iron powders.

Suggested uses: Home appliances, fractional horsepower motors, power tools, light machinery, instruments, light vehicles, and communication equipment. *Write*: Amplex Div., Chrysler Corp., P. O. Box 2718, Detroit 31, Mich. *Phone*: Walnut 1-6733

Heavy Duty Compressor

The AR-4 intermediate size stationary air compressor (weight: 5610 lb) delivers up to 835 cfm of air at 100 psi.



Balance and smooth running characteristics permit operation as a skid-mounted unit if desired.

The compressor uses 10 per cent less power input than standard machines delivering comparable amounts of free air. *Write*: Atlas Copco Eastern, 610 Industrial Ave., Paramus, N. J.

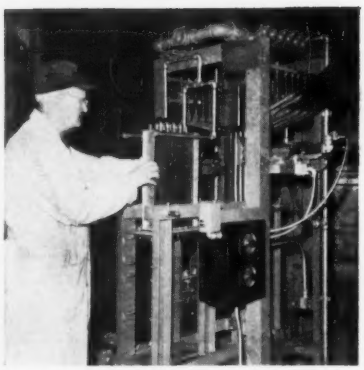
Boom Moves Odd Shapes

This hydraulic crane boom is for bulky, heavy loads of odd shape and size that cannot conveniently be handled with forks.

Fabricated from tubular steel, the boom is hydraulically actuated. The unit may be fitted to any Gerlinger fork lift truck. *Write*: Towmotor Corp., 1226 E. 152nd St., Cleveland, Ohio. *Phone*: Glenville 1-0900

Ups Coil Production

A custom engineered, shuttle type, brazing unit increases the production of heating and cooling coils. This gas-fired unit brazes U-shaped

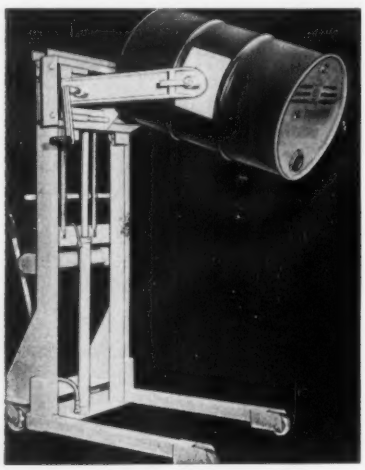


return bends on the coils, using preplaced silver alloy rings. Brazed joints are uniform.

One man loads and unloads the machine and operates the carriage by pushbutton. *Write*: Gas Appliance Service Inc., 1940 W. Balmoral Ave., Chicago 40, Ill. *Phone*: Long Beach 1-1600

Handles Variety of Drums

The Stak-R-Dump portable front-end dumper and stacker economically handles drum type containers from 24 in. diameter (55 gallon) down to 14½ in. diameter (15 gallon).



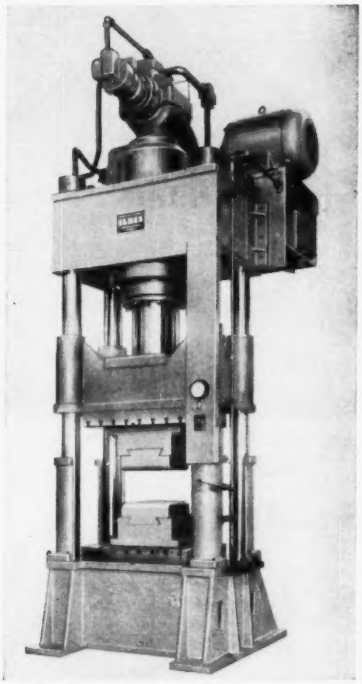
It has a capacity of 750 lb, and a maximum dumping or pouring height of 48 in. at a 30-degree angle. *Write*: Tubar Dumper Div., Uhrden Inc., Dennison, Ohio.

Press for Hot Forging

This hydraulic press is a 500-ton unit designed for high speed hot forging with open (shown) or closed die work.

The press can be operated by

NEW PRODUCTS and equipment



either of two control levers, one at the machine and one remotely located. Speed of operation is under control of the operator at all times. *Write*: American Steel Foundries, 1150-X Tennessee Ave., Cincinnati 29, Ohio. *Phone*: Redwood 1-9210

Welder for General Use

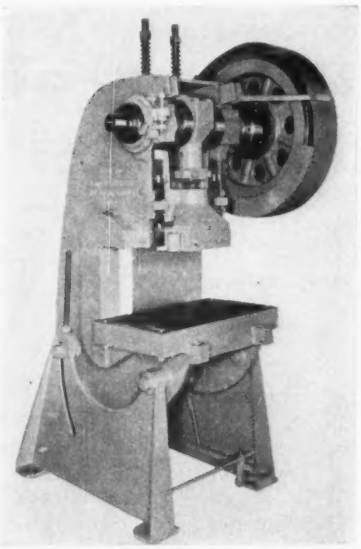
This general purpose, heavy duty spotwelder has a frictionless air head and slide unit. A foot switch starts the automatic weld sequence.

Throat depth is 18 in. The operating cylinder has a 3-in. stroke. The heat regulator is integrated with the 100-kva transformer. *Write*: Federal Machine & Welder Co., Warren, Ohio. *Phone*: Franklin 4-1501

Press Does Heavy Work

The 40-ton Press-Rite OBI press can handle large die sets for trimming diecastings and other jobs that would usually require a larger press.

Its heavily reinforced frame allows large ram and bed areas, and extra throat depth.



Flywheel or back-geared models are available with mechanical or Airflex air friction clutch. *Write*: Sales Service Mfg. Co., 2363 University Ave., St. Paul 14, Minn. *Phone*: Midway 6-8663

Conveyor Elevates

Flexible Limber-Dip sections of monorail can be raised or lowered while the conveyor is in operation.

They are applicable to systems for alternate dipping and skipping, or to systems that may alternate between two or more dip baths.

They can also be used for loading or unloading operations. *Write*: Dearborn Fabricating & Engineering Co., 19440 Glendale Ave., Detroit 23, Mich. *Phone*: Broadway 3-2800

NEW literature

Write directly to the company for a copy

Phosphating Compound

Metex Durafos No. 8, a dry iron phosphating compound designed to clean and treat steel, aluminum, zinc, and cadmium in one operation, is described in Data Sheet No. 11. It provides a dense, uniform, fine grain coating. MacDermid Inc., Waterbury, Conn.

Immersion Heaters

How to get the most service with least maintenance from industrial immersion heaters is shown in Bulletin GER-1161. It discusses operation and maintenance problems involved with both free flowing and forced circulations and tells how heaters should be installed. General Electric Co., Schenectady 5, N. Y.

Ingot Cost Savings

Savings in over-all ingot costs obtained from using Chromtemp exothermic ferrochrome for large open-hearth ladle additions are described in a folder. Electro Metallurgical Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Capillary Tubing

The definition of capillary tubing, materials from which it is produced, tolerances, finishes, special processing and inspection procedures, purposes and method of flow testing, and ordering information are given in Data Memorandum No. 11. The material is furnished in lengths up to 3000 ft. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Spray Products

Detailed information on aerosol spray products for industrial applications is contained in a booklet. Some suggested uses: Rust inhibitor, plastic spray, toolmaker's ink, cleaning and lubricating oil, glass frosting, and paint. Dept. SIC, Crown Products Co., 1003 Amsterdam St., Woodstock, Ill.

Vacuum Metallizing

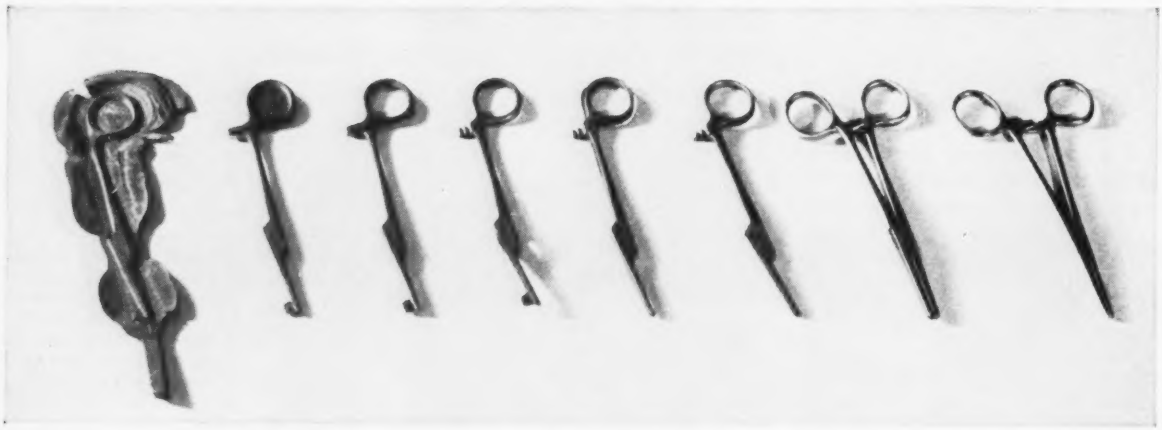
Tungsten Coils for Vacuum Metallizing describes standard vacuum metallizing coils by dimension and type of material rather than code number. Total filament length data have been converted from millimeters to inches. Chemical & Metallurgical Div., Sylvania Electric Products Inc., Towanda, Pa.

Speed Reducers

Shaft mounted speed reducers designed for a variety of speed reduction needs are described in book No. 2618. They can be mounted at angular or horizontal positions by tierod or foot mountings. Dept. PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

for strength, corrosion resistance and high finish

...it had to be Stainless



All orders for stainless steel for these artery forceps specify "Carpenter" because of "uniformity from shipment to shipment". Freedom from seams and excellent machining to close tolerances are other reasons given by the fabricator. The stainless is specially processed to meet the rigid specifications. By specifying Carpenter you can take the pressure off both designer and fabricator. High temperatures and stress variations are no longer problems. We'll back up our success stories with technical data and on-the-job service. Call your Carpenter representative for information on the stainless you need. The Carpenter Steel Company, 139 W. Bern Street, Reading, Pa.

Carpenter STEEL

The Carpenter Steel Company
Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Steel Prices To Hold in First Half

December 22, 1958

FIRM PRICES over the next six months are almost a certainty. There may be minor revisions in extras before July (see Page 88), but wholesale adjustments are out of the question.

Steelmakers face critical labor negotiations in the spring, and they're well aware that raising prices would undermine their efforts to reach a noninflationary settlement. If they're going to ask for restraint, they'll have to set an example.

Extras are out of line on some products (the August increases applied only to base prices), but the situation isn't regarded as serious. Mills aren't likely to raise extras because: 1. They're in reasonably good balance. 2. Market conditions aren't favorable. 3. More business would be lost to foreign competitors. 4. Costs aren't rising as fast as previously. 5. Profits are improving. 6. Aluminum producers, strongly competitive with steel in some markets, have assured their customers of firm prices until July.

CRUCIBLE UPS STAINLESS— Crucible Steel Co. of America surprised the industry by raising its base prices (about 3¾ per cent) on stainless steel billets, bars, and wire. The increases were needed to offset higher wages and fringe benefits, the company stated. Flat-rolled products weren't affected. It's a safe bet that no producers are contemplating higher prices for sheets and strip before July. Competitive conditions within the industry won't permit any markups.

STRIKE AHEAD?— Seldom has the steel industry approached labor negotiations with so little hope for a peaceful settlement. Union demands aren't known, and bargaining won't start before May, but producers and consumers are getting set for "the strike." Says a market analyst of one steel company: "If I were a buyer and if I'd made a decision to increase my inventory, I'd start building now."

STEELMAKERS STOCKS UP— Anticipating a greater demand for steel in the first quarter, mills are increasing their inventories of ingots and semifinished material. Slabs are being stocked for rapid processing into sheets and strip when demand picks up. Preparations are also being made for a resurgence of markets for standard pipe and oil country goods.

OUTPUT TOPS CONSUMPTION— Chicago mills operated their furnaces at 87 per cent of capacity last week, the highest rate in 18 months. Output exceeded consumption since both producers and users were adding to their inventories. Nationally, steelmaking operations jumped another half point to 76 per cent of capacity, highest point of the year. Production was about 2,057,000 net tons of steel for ingots and castings.

AUTOMAKERS BUY MORE— At Detroit, Fisher Body Div. of General Motors Corp. says its steel inventories average 16 days. In the first quarter of 1959, it will buy 5 per cent more steel than it did this quarter and 100 per cent more than it took in the first quarter of 1958. Chrysler Corp. claims it has a 20-day inventory and says it won't stock more than that because of space limitations. Barring continued labor difficulties, its January purchases will be 10 to 15 per cent greater than those of December.

ADAMS FORECASTS '59— Here's how Avery C. Adams, chairman and president of Jones & Laughlin Steel Corp., sees industry operations in 1959: First quarter, 80 per cent of capacity; second, 91; third, 68; fourth, 78. Production will average 79 per cent of capacity over the year, and output will be 115 million ingot tons, he believes.

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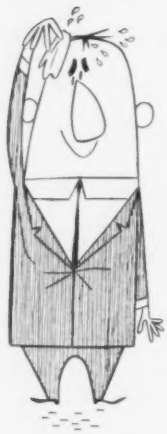
*Current prices were published in the Dec. 15 and Dec. 1 issues and will appear in subsequent issues.



Memo to Steel Consumers: Higher 'Extras' Unlikely

Persistent rumors of upward revisions have started largely among worried steel users. Minor shifts may come in the next six months, but odds are against major changes

STEEL buyers can be reasonably sure of firm prices for the next six months. Extras on some products may be revised before July, but no sweeping adjustments of the kind made early in 1957 are likely.

• **Reason No. 1**—Steelmakers can think of many reasons for not raising extras now, but none is more compelling than their desire to negotiate a new labor contract from a position of strength.

In recent speeches, industry leaders have emphasized the dangers of wage inflation and foreign competition. They're determined to resist any wage demands by the United Steelworkers that aren't related to productivity gains (see Page 33). If they raise prices before the bargaining starts, they'll be in no position to ask for union forbearance.

• **Reason No. 2**—Extras are in reasonably good balance. "Ideally, they should be changed every time you alter the base prices," a market analyst comments, "but you can't do it quite that way in practice. There'd be too much of a shock if all the changes were made at once." The base price-extra relationship is somewhat out of line because the August increases affected only the base prices, but the situation isn't regarded as serious.

"You never have perfect price structure," says Richard F. Sentner, executive vice president, commercial, U. S. Steel Corp. "As a result of our regular review of our price structure, we always have revisions under consideration. Implementing these revisions is a matter of judgment that must take into consideration market conditions, competition, and many other facts."

• **Reason No. 3**—Market conditions aren't right for the revision of extras. Although the operating rate is nearly 30 points above the April low (47 per cent of capacity), production certainly isn't at boom proportions. When extras were raised the last time (January, 1957), the ingot rate was close to 100 per cent. There's an abundance of most steel products (only cold-rolled and coated sheets require long leadtimes), and buyers are acutely cost conscious. In the Detroit area, finish and size extras are being waived.

• **Reason No. 4**—If U. S. steelmakers raised extras, they would lose more business to foreign competitors. European and Japanese mills are already a serious threat to the domestic wire industry. The volume of plates and structurals that's being imported is mounting every day. Midwest fabricators say tank plates from Holland are $24 a ton cheaper than those made in the U. S. and of comparable quality.

• **Reason No. 5**—Costs aren't rising as fast as they were. A leading steelmaker estimates that billings from purchased goods and services will increase only 3 per cent from September, 1958, through August, 1959. Such basic raw materials as foreign open hearth iron ore and manganese ore will cost less in 1959 than they did in 1958. (Coal, scrap, limestone, and ferroalloys will probably cost more.)

In 1956, the year when steelmakers complained so vociferously about inflation, one mill's costs rose more than 8 per cent. It predicts a rise of only 2.5 per cent in the next six months.

• **Reason No. 6**—Profits are improving. Third quarter results were considerably better than those of the first two quarters. Fourth quarter earnings will be the best of the year. The recession taught steelmakers a lot about increasing efficiency and cutting costs. As the ingot rate climbs, productivity will improve. Most companies will show a profit for 1958, even though industry operations averaged only 60 per cent of capacity.

Regardless of whether extras are raised, the first half of 1959 is bound to be profitable. First quarter operations will average about 80 per cent of capacity. During the second quarter, production should approach capacity as consumers build their inventories in anticipation of a strike.

• **Reason No. 7**—Less important than the other considerations but still to be reckoned with are the recent moves of aluminum producers. Aluminum is strongly competitive with steel in some markets; producers have assured their customers that no price hikes will come before July 1.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 96 & 99

"Things are looking favorable," a Pittsburgh sheetmaker reports. "Business usually tapers off in December because of the holidays and inventory adjustments, but this year's going to be an exception. We'll ship a bigger tonnage this month than we did in November.

"Judging from what we've booked thus far, there will be no letup in January or February. But it's too early to say whether the first quarter of 1959 will be better than

Call your AIM*... Pacific States Cast Iron Pipe Co. does...

Acme Steel Strapping protects pipe shipments

PACIFIC STATES CAST IRON PIPE CO., PROVO, UTAH, wanted to improve arrival condition of cast iron pressure pipe shipped in gondola cars. So they called in their Acme Idea Man.

Together, they arrived at a bracing method using heavy-duty Acme Steel Strapping that virtually eliminated in-transit damage (Idea No. U3-2). Lengths of lumber are placed on the sides and bottom of a gondola car and four lengths of strapping are laid in position. Pipe is loaded and strap is tensioned and sealed, resulting in two secure units.

Now pipe arrives in damage-free condition and is faster to unload since orderly lading presents no unusual materials handling problems or hazards for consignee personnel.

Wayne Dabb works with Pacific States Cast Iron Pipe Co. to solve their product protection problems.

***Call your Acme Idea Man.** He has scores of time-saving, product-protecting ideas, many of which may help you. Write Dept. SDS-128, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

the last three months of 1958. We'd like to increase our semi-finished inventory, but we're using all the steel we can make to meet our immediate requirements."

Demand is broad based, but the automotive and appliance industries are supplying most of the strength. Steelmakers are getting fill-in orders from Detroit as the car manufacturers step up their production schedules. Some buying by the farm implement makers is expected when present labor troubles are eliminated.

Deliveries are tightening. Although hot-rolled sheets can be had in three to four weeks in the East, some makers have little to offer under five to six weeks. Cold-rolled sheets are available in around six weeks, and some mills are booked eight and nine weeks ahead.

Most sellers of continuous hot dipped galvanized sheets are booked up for the first quarter. They report mounting inquiry for the second quarter, which, for the most part, they are trying to discourage now. There's no question that galvanized sheets are the most active of the major products.

Hedge buying is expected in February and March to cover against second half production difficulties which may be brought about by a steel strike. Some consumers are making up their procurement schedules on the basis there will be steel labor trouble at midyear, and a considerable number of them seem convinced there will be substantial allocation of production.

Most sheet specialties, such as electrical sheets, enameling stock, and stainless, are in fairly comfortable supply. Stainless sheets and strip deliveries are available in four to six weeks. Business in some specialties has leveled off, but producers are booked fairly well ahead on electrical sheets and enameling stock. One mill is booked into March on enameling stock, with good specifications from manufacturers of stoves, sanitaryware, refrigerators, and other appliances.

Prestressed Strand Price Cut To Check Imports

Producers of prestressed strand have reduced their prices 10 to 15 per cent, depending on destination, in a move to combat the flood of imported material coming principally from England, Germany, Belgium, Italy, and Japan. The foreign competition has been increasing the last two or three years, and has been especially heavy during the current year.

It is reliably reported that foreign prestressed strand has accounted for 15 to 18 per cent of all such material bought in this country so far this year. Shipments have been arriving principally through South Atlantic and Gulf ports.

The new prices (see Page 100) are for delivery to any point in the U. S. and are not on an f.o.b. mill basis. These reductions, combined with better domestic deliveries and services, should retard the foreign flow to this country.

Wire mill bookings are slightly heavier for January shipment. December volume was the lowest for any month in the last quarter. Forward buying is retarded by relatively prompt shipment of most carbon grades. In the case of the higher carbon grades for automotive application, shipments are a little more extended.

Consumers' inventories of manu-

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facturers' wire are low, being held down at yearend for tax purposes.

Cold-heading wire orders for early first quarter delivery are starting to improve.

The electrogalvanizing line at the Worcester Works, American Steel & Wire Div., U. S. Steel Corp., will be able to handle larger tonnage in the first quarter.

Merchant wire products are seasonally sluggish.

Steel Bars . . .

Bar Prices, Page 95

An upturn in January, following a holiday lull, is in prospect for steel bar demand. Most sellers look for still further gains in February and March, especially if automotive requirements improve as expected.

After the turn of the year, hot carbon bar producers also expect better specifications from fastener manufacturers, cold drawers, and warehouses. They see some gains in railroad needs, but not much.

While a gain in auto specifications is expected, the barmakers are still counting most on a good diversity of inquiry to increase their volume in the first quarter. They anticipate improved buying for inventory, as well as current needs.

New England sellers report orders are slightly more frequent, but they are spotty. Forge shops are contributing little support to demand.

"Last month's shipments were on a par with October's (25 per cent above the September level), but we're due for a little setback this month," a Pittsburgh area producer said last week. "Holidays and inventory adjustments are bound to curtail our December shipments. The outlook for January is encouraging. It will probably be the best month we've had in a long time. We look for continued strong demand from the implement trade, and bigger orders from the automotive industry."

Shipments of cold-finished bars will drop about 10 per cent this month, but producers are optimistic over prospects. Current operations (about 75 per cent of capacity) are the best of the year. One mill reports that the fourth quarter was the most profitable it has had in a year and a half. Customers are still buying on short leadtime.

Deliveries on hot carbon bars remain around two to four weeks, but early rollings are a little more difficult to get than a month ago. Alloy bars and the smaller sizes of carbon bars are available from stocks.

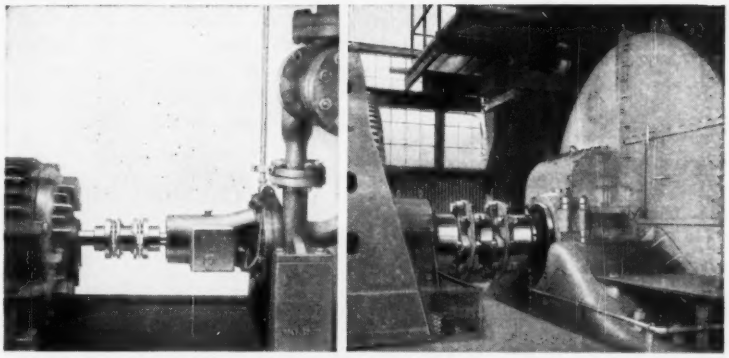
Jones & Laughlin Steel Corp. announces its new Jalcase 100 grade of cold finished bars is now available with a lead addition. The leaded product is known as Jalcase 100-L. In addition to exceptional machining qualities, these features are claimed: High level, wear resisting hardness; minimum yield strengths of 105,000 and 100,000 psi, depending on bar diameters; stabilized residual stresses that reduce after-machining distortion.

Tubular Goods . . .

Tubular Goods Prices, Page 101

Pipe distributors are keeping their inventories down to a minimum, with buttweld and seamless, 14 in. and under, available from stock. Direct mill shipments are

Protect your PUMPS and other Indispensable MACHINERY with THOMAS FLEXIBLE COUPLINGS



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Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.
They will protect your equipment and extend the life of your machines.
Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES:

- Freedom from Backlash
- Torsional Rigidity
- Free End Float
- Smooth Continuous Drive with Constant Rotational Velocity
- Visual Inspection While in Operation
- Original Balance for Life
- No Lubrication
- No Wearing Parts
- No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

off. The bulk of new business is for stock replacement, calling for prompt shipments.

Only large tonnage inquiry of note: Requirements for fleet berthing projects at Newport, R. I., where several hundred tons are needed.

Mechanical and pressure tubing deliveries are available in two to three weeks.

Sellers in the Los Angeles market report their fourth quarter sales of continuous weld pipe, ½ through 4 in., are up about 20 per cent over third quarter volume. Their line pipe business remains dull, except in the large diameters.

Kent and Elma, Wash., have awarded contracts for small tonnages of cast iron pipe. Snohomish, Bremerton, and Tacoma, Wash., have asked for bids on small lots. An unstated tonnage of cast pipe will be required for the Puget Sound (Wash.) drydock project, on which bids were taken Dec. 17.

Distributors . . .

Prices, Page 102

Steel distributing points aren't as active as they were due to the approaching holidays. Distributors anticipate an improvement in demand after the turn of the year, with January volume surpassing December's.

Volume of distributors hasn't improved to the same extent as that at the mill level, though fourth quarter sales are substantially above the third quarter's. Sales on the West Coast are 7 to 8 per cent above the third quarter's.

Flat-rolled items are the products in best demand, but bar business has also been fairly good in recent weeks.

A spokesman for major steel service centers in the Texas area says the market is depressed by low priced import steel. Warehouse prices are holding in the district, but users are shopping around before placing orders. Many important area distributors are selling imported steel, being forced to take on foreign tonnage because of competition from newly established firms.

One reason foreign mills have dumped so much steel in the Southwest: It is comparatively easy to get into the distributing business; in many cases sellers serve as brokers without stocking any steel themselves.

Plates . . .

Plate Prices, Page 95

First quarter plate business is expected to show moderate improvement over that in the period now closing. Construction requirements, it is thought, will be heavier, and more tonnage will be required for heavy industrial equipment, and, possibly, for railroad facilities.

Shipwork will at least hold steady next quarter, and line pipe plate needs may be stimulated before the period is over as result of the Supreme Court's decision in the Memphis gas rate case.

Tank and boiler requirements appear to be shaping up in encouraging volume.

Plate deliveries show little change. Sheared carbon is available in around two weeks. Silicon and alloy plates are being offered for delivery in three to four weeks in some cases.

Two major projects involving plates are up for consideration by fabricators in the Pacific Northwest. The Puget Sound (Wash.) drydock, bids Dec. 23, involves 6000 tons of sheet piling, while Seattle will open bids Jan. 21 for the Tolt River water supply line calling for 18,855 tons of 54 to 66 in. steel pipe. Portland, Oreg., invited bids Dec. 19 on an unstated tonnage of plates involved in a 9900 ft, 36 in. water supply line.

A midwestern platemaker reports there has been no effect on sales resulting from the Supreme Court's decision in the Memphis case. Another maker notes a sizable improvement and is now much more optimistic. Apparently, the Court's decision caught certain pipeline projects about ready to go, and orders could be released soon. Full impact of the decision is expected in second quarter next year.

Imported Steel Flooding Southwestern Markets

The pressure of imported steel in southwestern markets continues to mount. Through the first ten months of this year, slightly more than 300,000 tons of foreign steel were imported through Texas ports

Finished Steel Shipments—October, 1958

(All grades; net tons)

	October, 1958			Total First 10 Months	
Products	Carbon	Alloy	Stainless	1958	1957
Ingots	12,215	10,074	1,541	218,959	410,021
Blooms, slabs	72,483	31,697	1,155	895,983	2,069,118
Tube rounds	910	54	3	8,092	54,026
Skelp	16,929	.....	.....	94,169	141,707
Wire rods	96,483	1,820	623	715,214	817,918
Structurals	363,030	2,292	17	3,299,773	5,758,220
Steel piling	33,993	.....	.....	369,552	492,317
Plates	423,468	35,320	2,198	4,314,812	8,150,346
Rails (standard)	35,612	.....	.....	468,600	1,087,183
Rails (other)	2,977	.....	.....	33,172	77,394
Joint bars	2,514	.....	.....	31,241	74,272
Tie plates	5,055	.....	.....	97,567	222,184
Track spikes	3,244	.....	.....	35,699	68,541
Wheels	14,633	46	.....	132,725	324,464
Axles	4,232	14	.....	63,053	178,601
Bars (hot rolled)	472,136	118,265	3,403	4,508,106	6,574,834
Bars (reinforcing)	183,899	.....	.....	1,739,394	2,058,547
Bars (cold drawn)	83,442	14,934	4,094	810,931	1,140,096
Tool steel	838	6,379	.....	56,834	84,946
Pipe (standard)	212,014	44	3	1,836,734	2,340,450
Oil country goods	84,773	22,448	.....	908,439	2,495,733
Line pipe	226,490	9	.....	2,301,236	3,624,971
Mech. tubing	39,023	17,024	289	442,449	675,931
Pressure tubing	18,666	3,011	1,031	205,116	353,492
Wire (drawn)	224,088	3,680	2,322	1,945,415	2,238,175
Nails & staples	39,367	.....	2	368,140	402,050
Barbed wire	2,732	.....	.....	50,910	54,933
Woven fence	9,173	.....	.....	144,513	186,009
Bale ties, etc.	1,597	.....	.....	54,364	45,564
Black plate	93,374	.....	.....	558,088	530,985
Tin & terne plate, hot dipped	60,261	.....	.....	416,959	607,696
Tin plate, electrolytic	763,361	.....	.....	4,776,114	4,205,356
Sheets (HR)	664 305	20,002	2,966	4,949,121	6,693,443
Sheets (CR)	1,059,333	3,820	11,012	7,941,107	9,944,292
Sheets (galvanized)	290,157	.....	.....	2,308,467	2,042,902
Sheets (All other coated)	20,470	.....	.....	141,936	170,664
Elec. sheets & strip	2,808	42,907	.....	382,705	540,410
Strip (HR)	114,602	1,617	676	817,693	1,193,564
Strip (CR)	85,174	1,301	16,586	782,691	1,024,176
Total (1958)	5,839,861	336,758	47,921	49,226,073	.....
Total (1957)	6,119,550	381,638	49,502	.....	69,155,531

Data from American Iron & Steel Institute.

A spokesman for a Texas mill said imports are reducing demand for bread and butter items. Popular size angles, for instance, are being offered at about $40 a ton below domestic prices. Recent imports of Japanese plate runs about $20 below domestic quotations.

District steelmakers are hoping for tariff restrictions and are seeking to inform the general public of the snowballing import problem and its harmful effects on the economy.

Hikes Stainless Prices

Crucible Steel Co. of America, Pittsburgh, raised base prices on stainless steel billets, bars, and wire about 3¾ per cent, effective Dec. 15. Prices on stainless flat-rolled products were not changed.

The revisions were made to offset higher wages and fringe benefits that became effective last July 1, says Crucible. It's not known whether other producers will follow Crucible's lead.

Republic Steel Corp., Cleveland, has made a couple of revisions in its card of extras and deductions on stainless and heat resisting steels. The changes include a revision in quantity extras on stainless plates, and in billing weights for stainless plates.

Tool Steel . . .

Tool Steel Prices, Page 101

Crucible Steel Co. of America, Pittsburgh, recently announced a change in the finish of high speed steel rounds from ¼ to ⅝ in. diameter. In the future, all rounds in this size range will be furnished guaranteed free from decarburization to a plus or minus tolerance of 0.0015.

That's a revision from the former cold-drawn finish which was not furnished free from decarburization and was to a tolerance of plus 0.004 minus 0.000.

New extras applying to the new finishes are: ¼ to under 5/16 in., 33 cents; 5/16 to under ⅜ in., 29 cents; ⅜ in. to under ½ in., 22 cents; ½ to under ⅝ in., 19.5 cents.

Crucible also announced a downward revision of tool steel disc forging extras.

Steel Ingot Production—November, 1958

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1958								
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,902	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo..	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	593,600	48.6	6,420,405	53.7
August ...	6,481,185	62.4	134,435	39.3	670,383	54.8	7,286,003	61.0
September.	6,769,660	67.3	103,194	31.2	737,518	62.3	7,610,372	65.8
3rd Qtr. .	18,963,432	61.5	351,847	34.7	2,001,501	55.2	21,316,780	60.1
9 Mo. ...	52,756,296	57.7	985,023	32.7	5,327,948	49.5	59,069,267	56.1
*October .	7,795,541	75.0	148,458	43.4	873,779	71.5	8,817,778	73.8
November†	7,608,000	75.7	146,000	44.1	828,000	70.0	8,582,000	74.2
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	227,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,584	68.9	9,391,402	85.6
2nd Qtr. ..	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 Mo..	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
August ...	8,297,172	83.6	204,723	53.5	731,995	71.6	9,233,890	81.5
September..	8,135,139	84.7	185,967	50.2	656,800	66.4	8,977,906	81.8
3rd Qtr. ..	24,518,830	83.2	585,328	51.5	2,016,370	66.4	27,120,528	80.6
9 Mo.	78,851,294	90.2	2,077,515	61.7	6,775,266	75.2	87,704,075	87.9
October ..	8,348,522	84.1	154,577	40.4	694,618	67.9	9,197,717	81.1
Novemer .	7,674,698	79.9	134,709	36.4	583,512	59.0	8,392,919	76.5
December .	6,783,262	68.3	108,237	28.3	528,686	51.7	7,420,285	65.5
4th Qtr. ..	22,806,482	77.4	397,623	35.0	1,806,816	59.5	25,010,921	74.4
2nd 6 Mo.	47,325,312	80.3	982,951	43.3	3,823,186	63.0	52,131,449	77.5
Total ...	101,657,776	87.0	2,475,138	54.9	8,582,082	71.3	112,714,996	84.5

Note—The percentages are based on annual capacities as of Jan. 1, 1958: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric, and crucible, 14,398,740 net tons. Total: 140,742,570 net tons. In 1957, the capacity tonnages were: Open hearth, 116,912,410 net tons; bessemer, 4,505,000 net tons; oxygen process, electric, and crucible, 12,041,740 net tons. Total, 1957: 133,459,150 net tons.
*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

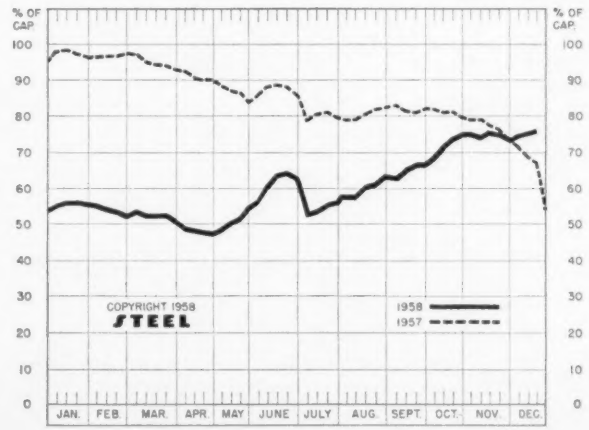
	Week Ended Dec. 21	Change	Same Week 1957	Same Week 1956
Pittsburgh	72.5	+ 0.5	62.5	103
Chicago	87	+ 2*	76	103.5
Eastern	72	+ 1	81	102
Youngstown	62	+ 2	63	104
Wheeling	84	+ 0.5	61	100
Cleveland	75	+ 6	69.5	104.5
Buffalo	66	— 2.5	63.5	107.5
Birmingham	67	+ 2	71	94
Cincinnati	84	+ 4*	68.5	90.5
St. Louis	94	+10.5*	75.5	90.5
Detroit	91.5	— 8*	81	99
Western	79	0	77	102
National Rate ..	76	+ 0.5	67.5	102

INGOT PRODUCTION‡

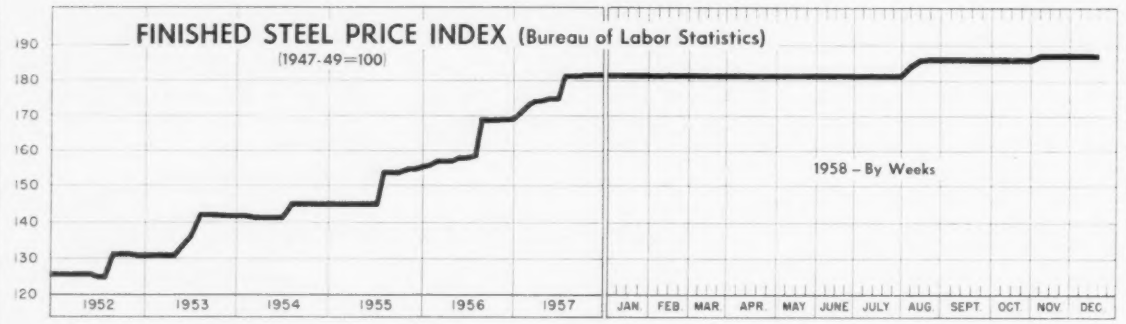
	Week Ended Dec. 21	Week Ago	Month Ago	Year Ago
INDEX ..... (1947-49=100)	126.7	123.6*	124.5	108.4
NET TONS .... (In thousands)	2,036	1,985*	2,000	1,742

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Dec. 16, 1958	Week Ago	Month Ago	Nov. Avg	Year Ago
187.4	187.4	186.7	187.4	181.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.695
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	20.525
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	24.315
		Pipe, Line (100 ft)	205.710
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	26.157
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 17 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$114.64
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	39.17	39.17	42.33	32.00	33.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 17 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.35
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.70	4.55
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton	Dec. 17 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.01	60.75
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.51	61.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$41.50	$41.50	$42.50	$31.50	$33.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	37.00	37.00	31.00
No. 1 Heavy Melt, Chicago	42.00	42.00	42.50	31.00	31.50
No. 1 Heavy Melt, Valley	42.50	42.50	43.50	29.50	29.50
No. 1 Heavy Melt, Cleve.	39.00	39.00	40.00	26.50	29.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	35.50	31.50	29.50
Rails, Rerolling, Chicago	62.50	63.50	62.00	49.50	42.50
No. 1 Cast, Chicago	45.50	45.50	45.50	37.50	33.05

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	30.50	30.50	30.50	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Dec. 17, cents per pound except as otherwise noted. Changes show in italics. Code number following mill points indicates producing company. Key to producers, page 96, footnotes, page 100.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B3 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 .80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....113.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 .99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 .119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
N. Tonawanda,N.Y. B11..6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Struthers,O. Y1 ....8.05

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ....6.50
Munhal,Pa. U5 ....6 50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.75
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14 ..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, ALLOY
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L17 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14 ..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa, Pa.(9) J5 ..5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 ....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ..5.675
LosAngeles(9) B3 ....6.375
Massillon,O. (23) R2 ..6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 ....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5 .5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14 ..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa, Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ....10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind.J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2.9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putman,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
WillimantieConn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
CumberlandMd. (5).C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ..9.325
Massillon,O. R2, R8 ..9.025
Midland, Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N. J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ..9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ....6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated; to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00

BARS, Rail Steel

ChicagoHts.(3) C2, I-2..5.575
ChicagoHts.(4)(44) I-2..5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 ....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 ....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1.7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ...7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ...6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1.6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ...6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1.9.275
Irvin,Pa. U5 .....9.275
Lackawanna(37) B2 ...9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
SparrowsPt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
SparrowsPt.(39) B2 ..10.025
Pittsburgh J5 .....10.125

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Youngstown J5 .....7.50
Weirton,W.Va. W6 ....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 ....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ...6.875
Ind.Harbor,Ind. I-2,Y1.6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke. Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simmons Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am.Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

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When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact . . . the qualities that they *pay* for—they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Roebling... Your Product is Better for it

Facts to consider when you're buying

Chromate Conversion Coatings

for Corrosion Protection, Paint Base, Decorative Finishing

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002″ max.) gel-like, complex chromate film of a nonporous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

If your company is manufacturing or buying parts or complete assemblies made from or plated with any of the more common non-ferrous metals—zinc, cadmium, aluminum, magnesium, silver, copper, brass or bronze—you've probably already run up against the question of finishing these surfaces with a chromate conversion coating. These coatings are used to protect against corrosion, or to provide a base for paint or to provide a decorative finish for sales appeal or shelf life. Since chromate conversion coatings represent a relatively new means of obtaining these finishes, this digest of facts to consider may be of value to you.

1. THE COATINGS THEMSELVES. There are many brands on the market. All are similar in many ways. Each, of course, offers its own specific advantages and these may relate to operating techniques, performance under actual use conditions, cost, availability, etc. Naturally, you'll want to choose a coating that is widely known and accepted under both military and civilian specifications.

2. THE COMPANY BEHIND THE PRODUCT. Is it a reliable, established organization? Does it offer experienced technical service, both from the field-engineering organization as well as the home office and laboratories? The man who sells and services your installation should be thoroughly familiar with not only chromate conversion coatings and their applications, but also with the characteristics and performance of related finishing operations such as precleaning, electroplating, painting, etc. This is most important since all steps of the finishing cycle must be functioning properly for the satisfactory performance of the ultimate finish produced.

3. AVAILABILITY OF THE PRODUCT. Ideally, of course, the material should be readily available to you from nearby warehouses to avoid time loss in long distance shipping and to provide emergency service, should the need arise.

4. COST. Naturally, the initial price of the material is important to you. However, just as you consider ultimate cost when you are buying mechanical equipment, ultimate cost must be considered for these finishing chemicals. So, it will pay you to investigate consumption costs, labor costs and the other factors which go into the determination of ultimate cost. Further, cost alone gives no indication of product performance, so careful attention must be given to the purpose the finish must serve and the value that finish will add to your product.

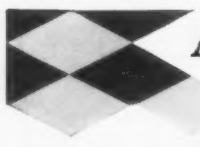
5. FACILITIES FOR RESEARCH AND DEVELOPMENT. Perhaps the existing types of chromate conversion coatings do not include a compound that will accomplish exactly what you wish. Then, it is important to deal with a supplier who has adequate research and development facilities available to work with you to produce a material to meet your needs. Naturally, such a project is seldom completed overnight. But, with complete cooperation and confidence from both you and your supplier, chances are a satisfactory program can be completed.

These are the concepts of sales and service on which we, Allied Research Products, Incorporated, have developed and marketed the line of Iridite chromate conversion coatings . . . superior product performance, complete sales and technical service, easy product availability, economical cost, extensive research and development facilities. No doubt you are familiar with our line and have seen this trademark—

IRIDITE®

—in our advertising, technical literature or on shipping containers in your plant. Remember this trademark when you're buying or investigating chromate conversion coatings for your company. It's your assurance of quality, economical products from a reliable and established company, skilled sales and technical service from both our home office and a national network of representatives, immediate availability from warehouses in strategic industrial areas and our willingness to work with you to develop new finishes to meet your needs, should the present line fall short.

For complete information on Iridite chromate conversion coatings, write today for your free copy of our technical data file. Or, for immediate advice, call in your Allied Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.



Allied Research Products, Inc.

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BALTIMORE 5, MARYLAND

***Manufacturers* of IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals—West Coast Licensee: L. H. Butcher Co.**

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2,Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. F4	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
New York W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (20-27 Ga.; Dollars per 100 lb)

Aliquippa,Pa. J5	7.90	8.10
Niles,O. R2	7.90	8.10

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.25
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.975*	11.30*	12.00*	13.15*
IndianaHarbor,Ind. I-2	....	9.875*	11.20*	11.90*	13.05*
Mansfield,O. E6	....	9.875	11.70	12.40	13.55
Newport,Ky. A2	....	9.875	11.70*	12.40*	13.55*
Niles,O. M21	....	9.875	11.70	12.40	13.55
Vandergrift,Pa. U5	....	9.875	11.70	12.40	13.55
Warren,O. R2	....	9.875	11.70	12.40	13.55
Zanesville,O. A10	....	....	11.70†	12.40	13.55

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Muncie,Ind. I-7	8.00
N.Tonawanda,N.Y. B11	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint, Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W2	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5	10.00
LosAngeles B3	10.70
Millbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE

	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Sterling,Ill.(7) N15	177
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192†

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville,Ill. K4	17.95	19.75
Cleveland A7	17.85	....
Craw'dsville,Ind. M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville,Fla. M8	17.95	19.80‡‡
Johnstown,Pa. B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo,Ind. C16	17.25	18.80†
Minnequa,Colo. C10	18.10	19.65**
Palm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran.,Calif. C10	18.20	19.75**
Sterling(37) N15	17.25	19.05††
SparrowsPt.,Md. B2	17.95	19.75§
Waukegan,Ill. A7	17.85	19.40†
Worcester,Mass. A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa,Pa. J5	8.65	9.325§
Atlanta(48) A11	9.10	9.775§
Bartonville(48) K4	9.10	9.775
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville,Ind. M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown B2(48)	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) C16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen (48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
Sterling(48) N15	9.25	9.925††
St'ling(1)(48)N15	9.15	9.825††
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass. A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)
½ in. and smaller
3 in. and shorter ... 55.0
3¼ in. thru 6 in. .. 50.0
Longer than 6 in. .. 37.0
⅝ in., 3 in. & shorter 47.0
3¼ in. thru 6 in. .. 40.0
Longer than 6 in. .. 31.0
⅞ in. thru 1 in.:
6 in. and shorter .. 37.0
Longer than 6 in. .. 31.0
1⅛ in. and larger:
All lengths 31.0
Undersize Body (rolled thread)
½ in. and smaller:
3 in. and shorter .. 55.0
3¼ in. thru 6 in. .. 50.0
Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)
½ in. and smaller:
6 in. and shorter .. 48.0
Larger diameters and longer lengths 35.0
Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts
½ in. and smaller:
6 in. and shorter .. 48.0
Larger diameters and longer lengths 35.0
High Tensile Structural Bolts (Reg. semifinished hex head bolts, standard hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)
⅝ in. diam. 50.0
⅞ in. diam. 47.0
⅞ and 1 in. diam... 43.0
1⅛ and 1¼ in. diam. 34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:
All sizes 56.0
(Full container)
Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:
¾ in. and smaller.. 62.0
⅞ in. to 1½ in., incl. 56.0
1⅝ in. and larger.. 51.5
Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¾ in. and smaller.. 62.0
⅞ in. to 1½ in., incl. 56.0
1⅝ in. and larger.. 51.5
Hex Nuts, Finished (Incl. Slotted and Castellated):
⅞ in. and smaller.. 65.0
1 in. to 1½ in., incl. 57.0
1⅝ in. and larger.. 51.5
Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 62.0
¾ in. to ⅞ in., incl. 65.0
1 in. to 1½ in., incl. 57.0
1⅝ in. and larger.. 51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:
⅝ in. and smaller.. 35.0
¾, ⅞, and 1 in. .. 16.0
Longer than 6 in.:
⅝ in. and smaller.. 3.0
¾, ⅞, and 1 in. .. +11.0
High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 20.0
¾, ⅞, and 1 in. ... + 5.0
Longer than 6 in.:
⅝ in. and smaller.. +19.0
¾, ⅞, and 1 in. ... +39.0
Flat Head Cap Screws:
¾ in. and smaller, 6 in. and shorter .. +85.0
Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter... + 5.0
Longer than 6 in. .. +29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.85 and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$32.15	$48.20	$61.55	$81.10	$105.65
Buffalo W12	*28.95*	*43.40*	*55.40*	*73.00*	*95.10*
Cleveland A7	32.15	48.20	61.55	81.10	....
KansasCity,Mo. U3	32.15	48.20	61.55	81.10	105.65
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	32.15	48.20	61.55	81.10	105.65
Pittsburg,Calif. C11	....	48.20	61.55	81.10	....
Pueblo, Colo. W12	*28.95*	*43.40*	*55.40*	*73.00*	*95.10*
Roebling, N. J. R5	*28.95*	*43.40*	*55.40*	*73.00*	*95.10*
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	32.15	48.20	61.55	81.10	105.65

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U3	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.50
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.22
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	7.025
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9 14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	0.5	+28	+11.5	+37	+22	+45.5	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.25	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	39.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	40.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	41.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	42.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	44.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	45.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	45.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	53.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	46.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	55.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	66.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	87.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	87.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	71.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	79.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	88.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	54.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	135.50	149.25	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	64.75	79.25	79.25
403	....	....	28.25	....	32.00	33.75	30.00	40.25	40.25
405	19.50	25.50	29.75	36.00	33.50	35.25	32.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	30.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	31.25	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	40.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	31.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	31.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	41.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp., Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	34.75	40.65

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.165
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.455
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	..
Birmingham U6	....	62.50**	66.50	..
Woodward,Ala. W15	62.50*	62.50**	66.50	..
Cincinnati, deld.	....	70.20	....	..
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	..
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	..
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	..
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	..
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% and $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Troy,N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. F6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59¶	9.86¶	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.99
Boston	9.31	10.40	11.39	53.50	9.73	10.11	13.39 #	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.55	53.43	8.83	9.31	11.53 #	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	10.65	52.33	8.63	9.10	11.25 #	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	10.87	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.20	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.15[2]	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	10.64	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	11.10	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.20	9.25	11.34	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25 #	15.05	9.00	8.89	10.20
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.63	9.83	10.88	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.09	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.00	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.05
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **½ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $168; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $145; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73

Fluorspar

Metallurgical grades, f.o.b. shipping point Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	18.00-19.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom
Brazilian iron ore, 68.5%	26.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.25-$12.50*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $1.10 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00
South African Transvaal	
44% no ratio	22.00-23.00
48% no ratio	29.00-31.00
Turkish	
48% 3:1	51.00-55.00
Domestic	
Rail nearest seller	
48% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 99 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	

	Dollars
Aluminum: Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	33.00-48.90†
Bronze, 5000-lb lots	49.60-53.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	50.99-55.40†
Phosphor-Copper, 5000-lb lots	61.80
Copper (atomized) 5000-lb lots	42.30-50.80†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Melting grade, 99% 60 to 200 mesh, nominal: 1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (inches)	Length (inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.18
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $5.15 freight zone from works

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.10	$5.10	$5.00	$5.45
Bar Size Angles	5.00	5.00	4.90	5.33
Structural Angles	5.00	5.00	4.90	5.33
I-Beams	5.06	5.06	4.96	5.40
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.15	5.28	5.10	5.45
Wire Rods, O.H. Cold Heading Quality No. 5	6.05	6.18	6.00	6.30
Bright Common Wire Nails (§)	7.89	7.75	7.67	8.26

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal., f.o.b. tank cars or tank trucks, plant

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	22.00
Naphthalene, 78 deg	7.00
Toluene, one deg. (del. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, del.

Phenol, 90 per cent grade	15.50

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$12.00
Ammonium sulfate, granular	36.00

(Contact seller for points of availability)

Scrap Is Resisting Further Decline

STEEL's composite on the prime grade holds at $39.17, despite increasing market sluggishness as the holidays near. Some observers think slump has hit bottom

Scrap Prices, Page 106

Pittsburgh—Prices are unchanged in a lifeless market. No heavy melting scrap is being traded, but it's believed that mills could buy substantial tonnages at $42. Brokers expect little improvement before January.

Chicago — Light demand and abundant offerings are combining to produce a stable market here. Prices are almost completely unchanged. The situation prevails even though the district steelmaking rate is 87 per cent of capacity the highest since June, 1957. Scrap is being generated at a volume far beyond the ability of dealers and brokers to find takers. A quiet market is the outlook for the rest of the year.

Philadelphia — Trading is featured by the purchase of a fairly sizable tonnage of No. 2 bundles by the Fairless Works (U. S. Steel) at $24.50, delivered. That's up $2.50 from the nominal level prevailing recently and represents the first purchase of dealer scrap for that plant since May, 1957.

The market is quiet, with no changes in the prime grades of open hearth material. Some traders believe the bottom of the recent downtrend is near, if not already reached. Since Oct. 1, when the price was $42, delivered, the market on No. 1 heavy melting has dropped $8 a ton.

Cupola cast is off $1 to $39, delivered, but malleable is up sharply to $62.

Heavy turnings have been reduced to $30, delivered, while short shoveling turnings are higher at $21-$22.

New York—Brokers have dropped their buying prices on No. 1 cupola $1 a ton to $34-$35. Their prices for other grades are unchanged, with the market generally quiet, and little improvement anticipated before early January.

Cleveland—Trading is limited as the holidays approach, and no activity of any consequence is anticipated before next month. Prices are nominal in the absence of a buying test. The market continues weak, but some resistance to the downtrend is developing.

Detroit—While prices are steady, the market shows signs of weakness. More activity is reported in the No. 1 grades, but the outlook is for a drop of $1 to $2 a ton. Chrysler's list came out early, and tonnages indicate there should be a further softening of the market the rest of this month.

Buffalo—A fair movement of cast iron scrap and occasional orders

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STEELMAKING SCRAP PRICE COMPOSITE
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.
1957
1958
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
Dec. 17 1958 $39.17
Week Ago $39.17
Month Ago $40.67
Year Ago $33.17
Nov. Avg. $41.42

for limited tonnages of specialties are the only signs of activity in this market. Dealers continue to ship against mill orders placed at the start of this month. Foundries are calling for modest tonnages of cast iron.

Dealers are receiving relatively little material because collections have been slowed down by the weather.

Cincinnati—The market is in the holiday doldrums. Brokers are filling old orders, but there has been no new buying to provide a price test. Scrap collections are being hampered by adverse weather.

St. Louis—Prices are off $1 a ton on most open hearth grades. A few of the cast iron grades also are down by the same amount. The easiness results from too many offerings. Buyers have been ordering cautiously as the hodidays approach. There has been considerable postponing of purchases until after Jan. 1. A stronger market is forecast in the first quarter.

Birmingham—Market activity is confined to the movement of a few carloads. With one district mill closed by a strike, and another completely out of the market, sales of open hearth grades of scrap are absent. The largest electric furnace and most of the pipe mills will be out of the market the rest of this year. The export market continues inactive.

Houston—The market is lifeless. Expectations are that January mill purchases will be limited, and a decline in prices is anticipated, possibly as much as $5 a ton.

Mexican buyers, who sliced prices $3.50 a ton for limited December purchases, are talking about a $7 a ton slash if they return to the market next month.

One cargo for Japan is being loaded at Houston from an old accumulation.

In the absence of buying, and the likelihood of lower mill prices ahead, brokers are cutting back nominal quotations to $36 for No. 1 heavy melting steel.

Seattle—Larger buyers are out of the market, mill inventories being larger than usual. Yard receipts are light, with prevailing prices unattractive. Some dealers are seeking to accumulate stocks in anticipation of improved demand next quarter. Little additional first quarter export business is in sight. Prices are nominal.

Los Angeles—Prices are up $3 to $5 a ton due to increased export activity and a slight improvement in steel mill operations. One cargo is due to sail from this port on Dec. 20.

Fourth quarter sales of steelmaking grades of scrap were at least 20 per cent above those in third quarter, dealers report. All grades have been moving, particularly No. 2 heavy melting at $35.

San Francisco—Prices on the top grades of scrap are up about $4 a ton. The mills are being compelled to bid more avidly for tonnage with large lots of steel scrap scheduled to be moved on recently placed Japanese orders.

Iron Ore . . .

Iron Ore Prices, Page 103

December shipments of Lake Superior iron ore, closing the 1958 navigation season, totaled 75,313 gross tons, reports the American Iron Ore Association. That compares with only 19,498 tons in December, 1957.

The December tonnage brought the 1958 season's total movement to 52,868,028 tons, down 31,747,843 from the 84,615,871 tons moved in the 1957 shipping season.

The 1958 season total was the smallest since 1939 when 45,547,974 tons were moved from the head of the lakes to lower lake ports.

About 4000 tons of magnetite iron ore were recently shipped from a deposit in the Carter Creek drainage, east of Dillon, Mont., for further testing. Engineers estimate proved reserves at 200 million tons. The ore is said to run 30 per cent iron.

Pig Iron . . .

Pig Iron Prices, Page 102

Merchant pig iron sellers look for sales to increase after the holidays. They anticipate a steady improvement in ordering throughout the first quarter. Some think business in the new quarter will surpass volume in the period now closing.

Metalworking generally is expected to step up, and this, combined with depleted consumer inventories, should stimulate an active tonnage movement.

Domestic iron sellers are faced with further competition from abroad, particularly from Holland and West Germany. Foreign offerings are more numerous, and in most cases, prices are substantially below those quoted by domestic producers.

December iron shipments will be slightly better than those in December, report some midwestern sellers. January volume is expected to show still further improvement. Some iron is going into inventory.

Demand for pig iron is strongest from nonintegrated steel plants, with ingot mold makers next, followed by automotive foundries. Demand from farm implement makers and machine tool builders is slow—though machine tool people are showing a little more interest in the market.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Dec. 17, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 17	$39.17
Dec. 10	39.17
Nov. Avg.	41.42
Dec. 1957	32.77
Dec. 1953	36.99

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	33.00-34.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	27.00-28.00
No. 1 busheling	41.00-42.00
No. 1 factory bundles	46.00-47.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals:	
2 ft and under	47.00-48.00
3 ft lengths	46.00-47.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	47.00-48.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Random rails	53.00-54.00
Railroad specialties	48.00-49.00
Angles, splice bars	48.00-49.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	125.00-130.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt, indus.	43.00-44.00
No. 1 heavy melt dealer	40.00-41.00
No. 2 heavy melting	35.00-36.00
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	42.00-43.00
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	43.00-44.00
No. 1 busheling, dealer	40.00-41.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 3 ft	47.00-48.00
Punchings & plate scrap	48.00-49.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	43.00-44.00
Unstripped motor blocks	37.00-38.00
Clean auto cast	52.00-53.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt	45.00-46.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Angles, splice bars	54.00-55.00
Axles	69.00-70.00
Rails, rerolling	*62.00-63.00*

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	45.00-50.00

YOUNGSTOWN

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	29.00-30.00
No. 1 busheling	42.00-43.00
No. 1 bundles	42.00-43.00
No. 2 bundles	29.00-30.00
Machine shop turnings	15.00-16.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos	43.00-44.00
Electric furnace bundles	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00

CLEVELAND

No. 1 heavy melting	38.50-39.50
No. 2 heavy melting	25.00-26.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	38.50-39.50
No. 2 bundles	28.50-29.50
No. 1 busheling	38.50-39.50
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	39.00-40.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos, punching & plate	40.00-41.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	37.00-38.00
Heavy breakable cast	36.00-37.00
Stove plate	43.00-44.00
Unstripped motor blocks	32.00-33.00
Brake shoes	36.00-37.00
Clean auto cast	49.00-50.00
Burnt cast	33.00-34.00
Drop broken machinery	49.00-50.00

Railroad Scrap

R.R. malleable	63.00-64.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	49.00-50.00
Railroad specialties	50.00-51.00
Uncut tires	43.00-44.00
Angles, splice bars	50.00-51.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-215.00
18-8 turnings	115.00-120.00
430 clips, bundles, solids	110.00-120.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*37.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	*39.00*
No. 2 bundles	*27.00*
No. 1 busheling	*39.00*
Machine shop turnings	*18.50†*
Short shovel turnings	*20.50†*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	*48.00*
Stove plate	*44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00†*
Rails, 18 in. and under	*51.00†*
Rails, random lengths	47.50
Rails, rerolling	59.50
Angles, splice bars	47.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
No. 1 busheling	35.00-36.00
Cast iron borings	13.00-14.00
Machine shop turnings	*21.00-22.00*
Short shovel turnings	*22.00-23.00*
Bars, crops and plates	*42.00-43.00*
Structurals & plates	*41.00-42.00*
Electric furnace bundles	*37.00-38.00*
Electric furnace:	
2 ft and under	36.00-37.00
3 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	52.00-53.00
Unstripped motor blocks	40.00-41.00
Charging box cast	29.00-30.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-39.00
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	54.00-55.00
Rails, random lengths	44.00-45.00
Angles, splice bars	45.00-46.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	35.00
No. 2 bundles	*24.50*
No. 1 busheling	34.00
Electric furnace bundles	37.00
Mixed borings, turnings	18.00†
Short shovel turnings	*21.00-22.00*
Machine shop turnings	18.00
Heavy turnings	*30.00*
Structurals & plate	39.00-40.00
Couplers, springs, wheels	42.00-43.00
Rails, crops, 2 ft & under	56.00-57.00

Cast Iron Grades

No. 1 cupola	*39.00*
Heavy breakable cast	41.00
Malleable	*62.00*
Drop broken machinery	48.00-49.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	17.00-18.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	13.00-14.00
Low phos. (structurals & plates)	33.00-34.00

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Unstripped motor blocks	23.00-24.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	185.00-190.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	75.00-80.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	33.00-34.00
No. 2 bundles	25.00-26.00
No. 1 busheling	33.00-34.00
Mixed borings, turnings	17.00-18.00
Machine shop turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	42.00-43.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	44.00-45.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	42.00-43.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	24.00-25.00
No. 1 busheling	36.00-37.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	20.00-21.00
Cast iron borings	18.00-19.00
Low phos., 18 in.	45.00-46.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	38.00-39.00
Charging box cast	38.00-39.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	49.00-50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*36.00†*
No. 2 heavy melting	*30.00†*
No. 1 bundles	*36.00†*
No. 2 bundles	25.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	*44.00†*

Cast Iron Grades

No. 1 cupola	*43.00*
Heavy breakable	27.00-28.00†
Foundry malleable	*37.00*
Unstripped motor blocks	*33.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00†*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	25.00-26.00
No. 1 busheling	25.00-26.00
Machine shop turnings	7.00-8.00
Short shovel turnings	10.00-11.00
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	35.00-36.00
No. 2 bundles	22.00-23.00
No. 1 busheling	34.00-35.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	15.00-16.00
Punching & plate	37.00-38.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	34.00-35.00
Charging box cast	34.00-35.00
Heavy breakable	35.00-36.00
Unstripped motor blocks	19.00-20.00
Clean auto cast	49.00-50.00

SEATTLE

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	37.00
No. 2 heavy melting	35.00
No. 1 bundles	*35.00*
No. 2 bundles	*20.00*
Machine shop turnings	*15.00*
Shoveling turnings	*18.00*
Cast iron borings	*15.00*
Cut structurals and plate 1 ft and under	*48.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

SAN FRANCISCO

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*34.00*
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.*

No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

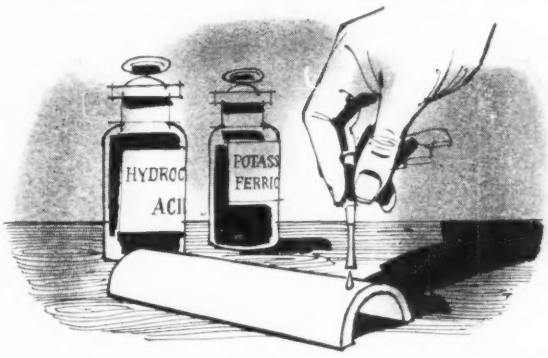
Cast Iron Grades‡

No. 1 machinery cast	39.00-41.00

*Brokers' buying prices.
†Nominal.
‡F.o.b. Hamilton, Ont.

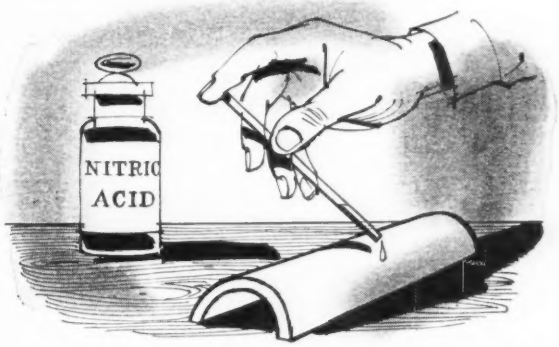
S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE

Rub specimen with emory paper to get clean surface.



Add 1 drop of 10% Hydrochloric Acid; allow 1 minute reaction time. Add 1 drop of 10% Potassium Ferricyanide; after 30 seconds, if red, green or yellow-brown color appears—or no color, sample belongs to nickel alloy group.

Here is how to test for MONEL



Add 1 drop of concentrated Nitric Acid and wait 1 minute. If it turns cloudy blue-green, the material belongs to the nickel-copper alloy group. Add a second drop of concentrated Nitric Acid. Yellow-green color after 5 minutes indicates MONEL or R MONEL. Clean another area of the specimen and add 1 drop of 1.1 Nitric Acid; allow 8 minutes reaction time. A bright green color indicates MONEL.

This nickel-copper alloy first appeared in 1905 when the chemical industry as we know it today was being born. It is especially valuable for use where such corrosives as sea water, sulphuric acid and strong caustic solutions are encountered. For this reason, it is frequently used by the paper and pulp industry as well as in the production of byproduct coke and gas, salt and petroleum.

Monel scrap, because of its nickel-copper content, is used in the production of the important low-alloy high strength steels. The non-ferrous foundry industry also finds it useful in the production of copper base alloys containing nickel. To satisfy this use of Monel it is important that it be separated from other scrap.

Our personnel, equipment, experience and strategically located facilities are specifically geared to supply you with dependably segregated alloy metals in any required amount. We welcome your inquiry.

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Year Is Ending Well

There's no boom, but December has shaped up as another month of high level activity for most metals. Look for prices to remain stable over the next few weeks

Nonferrous Metal Prices, Pages 116 & 117

NONFERROUS METAL sales, which fizzled in the early part of 1958, will close out the year with a bang. Early reports indicate December shipments will approach the October and November levels, even allowing for the slowdown that always marks the Christmas holidays.

The only negative note: New orders are coming in slower than they were a few weeks ago. The situation may be temporary, believe many metalmen: Customers may be adjusting inventories to get maximum tax relief.

Here's the outlook for the rest of the year:

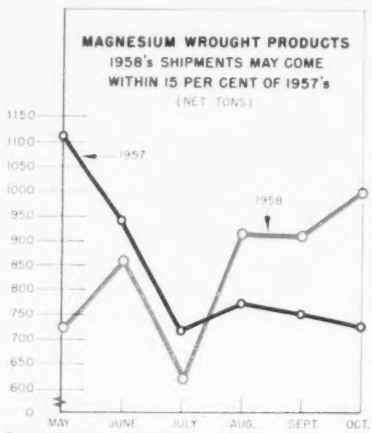
• **Copper**—Sales of primary producers are running slightly behind October's and November's, but the month will be a good one. While it's a little early to analyze January's potentials, early indications are it will also be a good month. The primary price looks firm at 29 cents a pound.

Custom smelter sales are following pretty much the same pattern as primary: Reports run from "about as good" to "a little below" November's figures. Little price action is expected.

If sales only hold close to the November mark, December will be a good month for the industry. Domestic deliveries of refined copper to fabricators in November were the best of the year, registering 131,288 tons, vs. 120,793 tons in October. Producers' refined stocks fell for the sixth straight month and now stand at 93,596 tons. (At the end of May, they were at 253,463 tons.)

• **Zinc**—Domestic slab zinc shipments hit 83,394 tons in November, a drop from October's 93,018 tons but still the second best month of the year for the industry. Stocks fell 19,000 tons to 191,744 tons.

You can expect the metal to make a similar showing in December. Galvanizing is still running at a breakneck pace. Leadtime on sheet orders has been stretched



out to an average seven to eight weeks. Detroit has come into the market for substantial tonnages.

January orders are only so-so, but most metalmen believe it will be a good month. No early price revisions are expected.

• **Lead** — After three months of good sales, lead is scheduled to take a dip in December. New orders are merely trickling in, which doesn't make January business look too promising.

Producers are accumulating lead, which puts pressure on the price, but it should hold until yearend.

• **Titanium**—The metal has shown erratic improvement, but the fourth quarter still hasn't lived up to estimates. December mill product shipments will exceed November's and may top the March figure of 509,165 lb, which has been the highest of the year.

• **Nickel**—November sales were the best in over a year. December should be just as good, perhaps a little better. All sales have been in market grade. No premium nickel is being moved.

The strike continues at International Nickel Co.'s Canadian holdings. Loss to date: 50 million lb. Chances for price stability are good. Says an Inco spokesman: "We anticipate no change in the nickel price in the foreseeable future."

Commenting on the nickel situation in 1958, Dr. John F. Thompson, Inco's chairman, said this year's Free World capacity is estimated to be 525 million lb. Capacity will rise to 550 million lb in 1959, 600 million lb in 1960, and 650 million lb in 1961, he adds.

Free World consumption this year is pegged at 325 million to 335 million lb, vs. 415 million lb in '58.

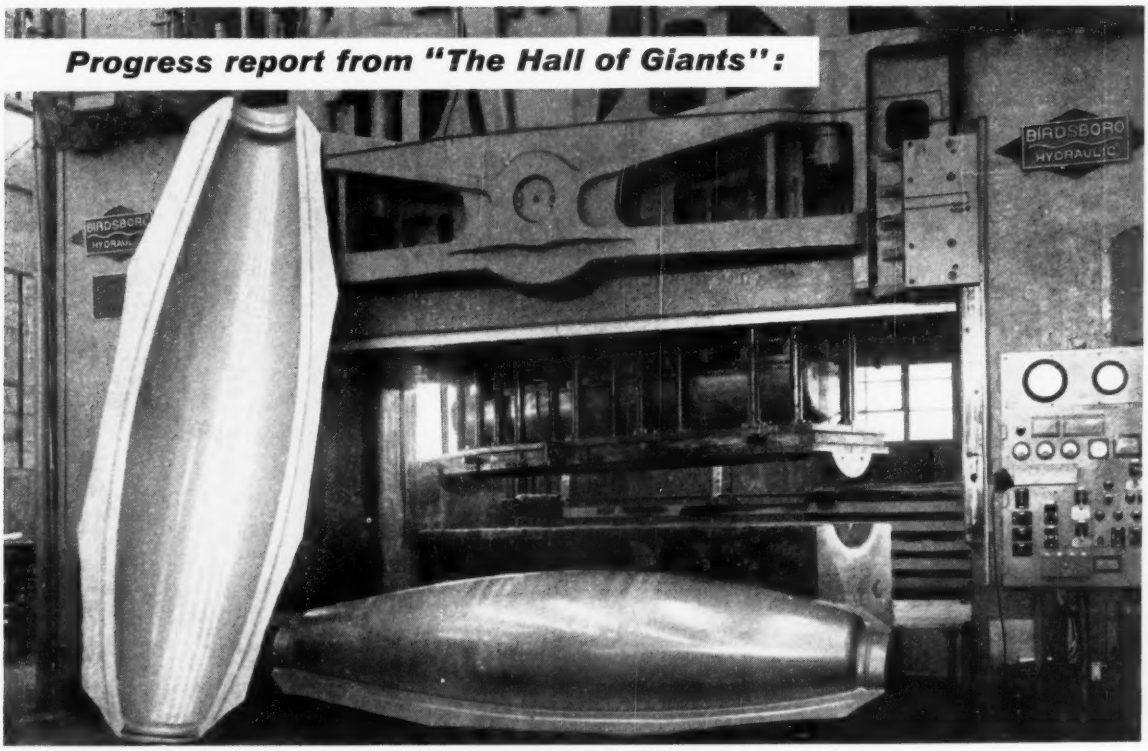
By fields, this breaks down: Stainless steels, 28 per cent; engineering alloy steels, 16 per cent; nickel specialty alloys, 16 per cent; foundry products, 15 per cent; electroplating, 14 per cent; copper and aluminum base alloys, 6 per cent; miscellaneous, 5 per cent.

NONFERROUS PRICE RECORD

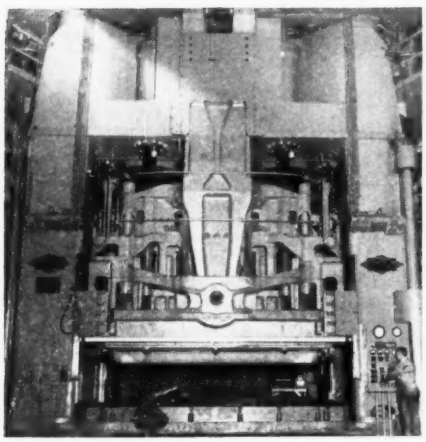
	Price Dec. 17	Last Change	Previous Price	Nov. Avg	Oct. Avg	Dec., 1957 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	28.50–29.00	Dec. 3, 1958	29.00	29.415	28.058	26.130
Lead	12.80	Oct. 14, 1958	12.30	12.800	12.473	13.300
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	89.875	Dec. 17, 1958	99.00	99.034	96.500	92.395
Zinc	11.50	Nov. 7, 1958	11.00	11.386	10.865	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Progress report from "The Hall of Giants":



versatile **BIRDSBORO** *8000-ton press now serving 6th trouble-free year at* ***LOCKHEED***



• Lockheed trims excess weight from high speed planes by forming larger sections, thus lowering the number of rivets and support members needed. Latest example: tip tank halves (for the new "Constellation") shown in the photo above. During most of its performance to date, this Birdsboro 8000-ton hydraulic press has operated around the clock, forming components from tough aluminum alloys, both light and heavy gauges. The "very successful" label the aircraft maker put on this press is typical of the satisfaction traditionally expressed by Birdsboro press users. Birdsboro will appreciate the opportunity to work with you on your press projects.

Main Office, Engineering Department and Plant: Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

HP.-37-58

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80. 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, $24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contaned Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 28.50-29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb. depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $222-225 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for adition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-17 per troy oz.

Platinum: $52-55 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 89.875 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 89.875.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 89.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.50; special high grade, 12.75 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.25; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max, 24.75-25.00; 13 alloy 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3 21.00; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 28.00; tin bronze, No. 225, 37.50; No. 245, 32.25; high-leaded tin bronze, No. 305, 32.25; No. 1 yellow, No. 405, 23.00; manganese bronze, No. 421 24.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.885 f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.865, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots 34.35; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.54; l.c.l., 36.29.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $8.50-15.95; sheared mill plate, $6.00-9.50; wire, $6.50-10.50; forging billets, $3.80-4.35; hot-rolled and forged bars $5.10-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90, C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard lengths, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in. 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-.30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire 21.00-21.50; No. 2 heavy copper and wire 19.00-19.50; light copper, 17.25-17.75; No. 1 composition red brass, 16.00-16.50; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	53.13b	50.36c	....	53.39
Yellow Brass	46.57	31.22d	47.11	49.98
Low Brass, 80%	49.23	49.17	48.87	52.54
Red Brass, 85%	50.17	50.11	50.71	53.48
Com. Bronze, 90%	51.65	51.59	52.19	54.71
Manganese Bronze	54.98	48.58	59.08	....
Muntz Metal	49.35	44.66	....	....
Naval Brass	51.24	45.05	57.80	54.65
Silicon Bronze	58.27	57.46	57.81	75.95
Nickel Silver, 10%	62.20	66.60	64.03	....
Phos. Bronze	72.59	73.09	72.59	74.27

SCRAP ALLOWANCES e (Based on copper at 29.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	25.000	25.000	24.250
Yellow Brass	17.000	16.750	15.250
Low Brass, 80%	21.250	21.000	20.500
Red Brass, 85%	22.125	21.875	21.375
Com. Bronze, 90%	22.875	22.625	22.125
Manganese Bronze	17.750	17.500	16.875
Muntz Metal	17.875	17.625	17.125
Naval Brass	17.625	17.375	16.875
Silicon Bronze	24.625	24.625	23.625
Nickel Silver, 10%	23.875	23.625	11.937
Phos. Bronze	25.875	25.625	24.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.00-15.50; new brass clippings, 14.25-14.75; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

Lead: Heavy, 8.25-8.75; battery plates, 3.00-4.25; linotype and stereotype, 10.50-11.00; electrotype, 9.00-9.50; mixed babbitt, 9.50-10.00.

Monel: Clippings, 30.00-31.00; old sheets, 27.00-28.00; turnings, 22.00-23.00; rods, 30.00-31.00.

Nickel: Sheets and clips, 52.00-55.00; rolled anodes, 52.00-55.00; turnings, 37.00-40.00; rod ends, 52.00-55.00.

Zinc: Old zinc, 4.00-4.25; new diecast scrap, 4.75-4.00; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.50-15.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.00-12.50.

REFINERS' BUYING PRICES
(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.50; light copper, 20.25; refinery brass (60% copper) per dry copper content, 22.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.50; light copper, 20.25; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.25.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45. **Copper:** Flat-rolled, 46.79; oval, 45.00; 5000-10,000 lb; electrodeposited, 38.50, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities. **Nickel:** Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25, 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb. **Tin:** Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00. **Zinc:** Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums. **Chromic Acid (flake):** 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more 29.50. **Copper Cyanide:** 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90. **Copper Sulphate:** 100-1900 lb, 14.65; 2000-5900 lb, 12.65; 6000-11,900 lb, 12.40; 12,000-22,900 lb, 12.15; 23,000 lb or more, 11.65. **Nickel Chloride:** 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00. **Nickel Sulphate:** 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00. **Sodium Cyanide (Cyanobrik):** 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80. **Sodium Stannate:** Less than 100 lb, 78.00; 100-500 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80. **Stannous Chloride (anhydrous):** 25 lb, 153.20; 100 lb, 148.30; 400 lb, 145.90; 800-19,900 lb, 105.00; 20,000 lb or more, 98.90. **Stannous Sulphate:** Less than 50 lb, 138.40; 50 lb, 108.40; 100-1900 lb, 106.40; 2000 lb or more, 104.40. **Zinc Cyanide:** 100-200 lb, 59.00; 300-900 lb, 57.00.

Structural Shapes . . .

Structural Shape Prices, Page 95

Although some sizable construction jobs are pending, including office buildings and bridgework, structural steel buying reflects the holiday slump.

Most fabricators expect some pickup in demand during January, with further gains in February and March, as projects come out for spring and summer programs.

Los Angeles fabricators report slow demand, though mill orders during November were up about 10 per cent over October's volume. Buyers are doing little long range ordering, apparently marking time until January when an upturn is anticipated in district aircraft and missile industry requirements.

Several large jobs are pending in the Pacific Northwest, and fabricators in the area are actively seeking new business as their order backlogs sink. Among important tonnages pending are the Navy drydock at Puget Sound (Wash.), involving 866 tons, and the Seattle freeway bridge, requiring 11,250 tons.

Next spring Inland Steel Co. will make three new beam sections on its 28 in. structural and wide flange

FOR SALE AT FRACTION OF ORIGINAL COST
PROPANE GAS GENERATING SYSTEM

Immediate Delivery — **New in 1952**

Used as Standby Operation Only

5000 C.F.H. — **1000 B.T.U.** — **Complete Plant**

Including Mixer, Compressor, Blower, Vaporizer, Load, Unload, And All Necessary Controls

30,000 Gallon Tank—Manufactured by Bethlehem Steel Company

National Board No. 1494	Brenner Compressor
Max. allowable Pressure 250 lbs.	2 Stage, 300 PSI
Max. allowable Temperature 650°	Powered by 5 HP
Shell Thickness 0.96	Dual Voltage Motor

LAMSON BLOWER	BRYANT BOILER
Pressure 5.0 lbs.	Unit 7-443
Vacuum 5.0 H_2O	LPG Gas
Sp. Gravity 1.29	Steam Radiation with
15 HP Capacity 8000 C.F.H.	Condensation Unit.

* * * * *

WINSTON MACHINERY COMPANY, INC.
326 West Ohio Street
Indianapolis 2, Indiana
PHONES: MElrose 5-2408 and MElrose 5-2409

CALL — **WRITE** — **WIRE**

CLASSIFIED

Positions Wanted

AVAILABLE:—M.E. and Master Mechanic. Experienced in all phases of the Forging Industry, Die Design, Machining, Maintenance, Heat Treating of Tools, Dies and Forgings, Processing of Tool and Die Welding. Reply Box 716, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

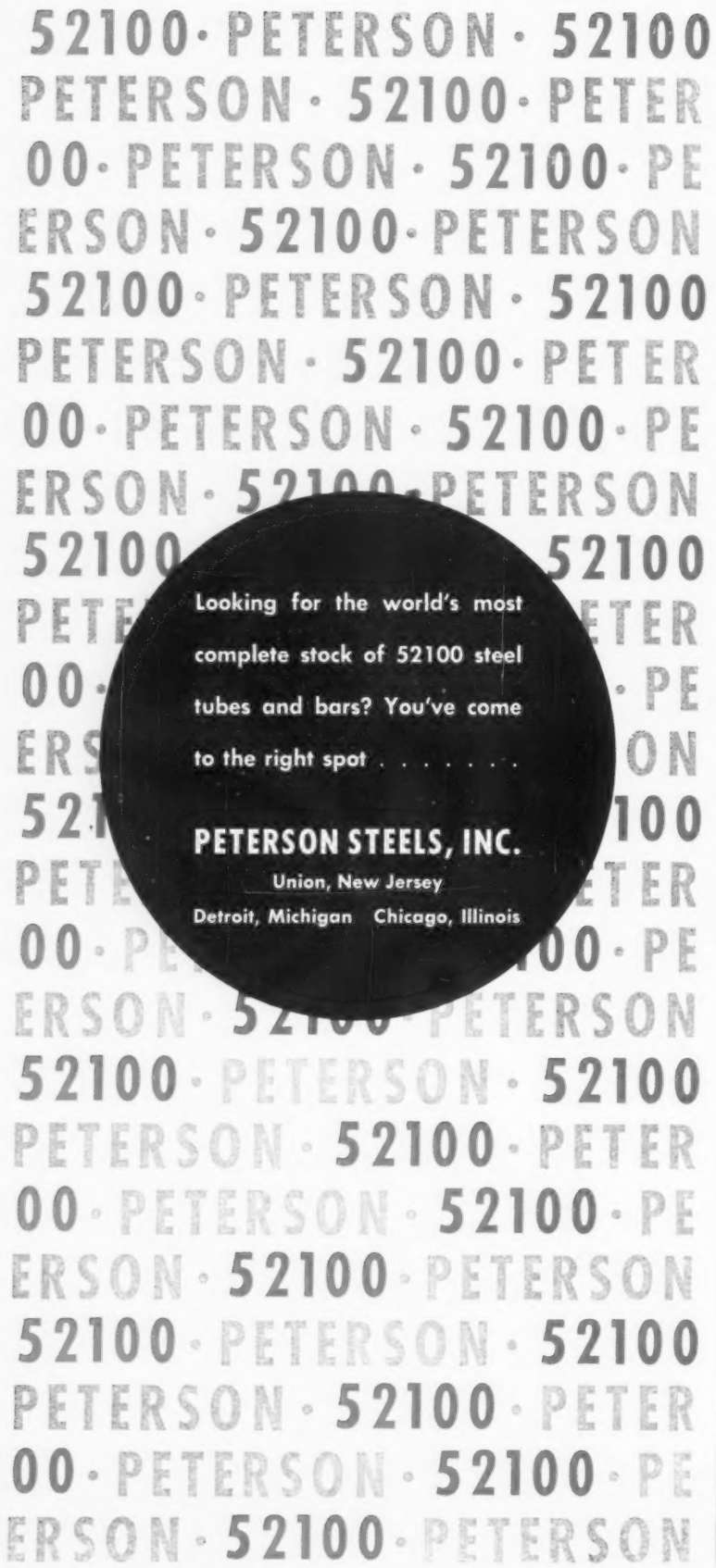
All classifications other than "Positions Wanted" set solid, 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14, all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

STRUCTURAL STEEL DESIGNERS & ESTIMATORS

Wanted immediately. Must be experienced and have good personality. Opportunity to be branch office manager. Prefer man in forties.

This leading Southern company has plants located in six cities.

Please send complete resume to Box 714, STEEL, Penton Bldg., Cleveland 13, Ohio. Replies will be held in confidence. Interviews arranged with qualified applicants.


52100 · PETERSON · 52100
Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .
PETERSON STEELS, INC.
Union, New Jersey
Detroit, Michigan Chicago, Illinois

beam mill. The sections, 12 by 12 in. wide flange, 12 by 18 in. wide flange, and 10 by 10 in. bearing pile, will be for use in building and bridge construction. The new sections will be added to the 15 already being rolled. It's possible for the mill to turn out about 31 sections.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3300 tons, Scudders Falls bridge, Delaware River Joint Toll Bridge Commission, Bucks County, Pennsylvania, through Conduit & Foundation, Philadelphia, general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

830 tons, junior and senior high school, East Stroudsburg, Pa., to Bethlehem Contracting Co., Bethlehem, Pa.

630 tons, state bridge, Monroe County, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, 18-story apartment, 235 E. 75th St., New York, through Sprain Contracting Co., general contractor, to Schacht Steel Construction Inc., New York.

325 tons, four galvanized steel microwave relay stations to Gate City Steel Inc., Boise, Idaho, by the Pacific Telephone & Telegraph Co.

STRUCTURAL STEEL PENDING

13,000 tons, office building, midtown Manhattan, New York, for Galbreath-Ruffin Corp.; early award anticipated; Turner Construction Co., general contractor.

1025 tons, state highway bridges, Stoneham-Winchester-Woburn, Mass.; M. DeMatteo Construction Co., Quincy, Mass., low on general contract.

900 tons, plant, Upper Merion, Pa., Philadelphia Gear Works, Philadelphia; bids close Dec. 23.

425 tons, welded girder bridge, Fall River, Mass.; bids Dec. 22, state highway department, Boston.

110 tons, school and gymnasium, Juneau, Alaska; bids in.

135 tons, state highway bridge, Lisbon, N. H.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2200 tons, Hawthorne Apartments, Philadelphia, through McCloskey & Co., general contractor, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

550 tons, garage, Broad and Locust Streets, Philadelphia, through John McShain, that city, to Sweet's Steel Co., Williamsport, Pa.

220 tons, three beam bridges, Bedford, N. H., to Truscon Steel Div., Republic Steel Corp., Boston; Munroe-Langstroth Inc., Norwood, Mass., subcontractor for bridges; Frank Palazzi & Son Inc., Johnston, R. I., general contractor; 305 tons of steel bearing piles, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, reinforcing bars and structurals, plant addition, Tileston-Hollingsworth Co., Hyde Park, Mass., to U. S. Steel Supply Div., U. S. Steel Corp., Boston, and Groisser & Schlager Co., Somerville, Mass. (structurals); Temple & Crane Inc., Boston, general contractor.

REINFORCING BARS PENDING

587 tons, state bridgework, LR 641 (22A), Beaver County, Pennsylvania, bids Dec. 30; 870 tons of structurals also required.

478 tons, state bridgework, Hopewell Township, Beaver County, Pennsylvania, bids Dec. 30.

364 tons, state bridgework, LR 1001 (1-C), Lackawanna County, Pennsylvania, bids Dec. 30.

161 tons, state bridgework, LR 799 (1), Franklin County, Pennsylvania, bids Dec. 30; 599 tons of structurals also required.

130 tons, Seattle's Tolt River bridge; Waller Construction Co., Seattle, is low bidder at $81,030.

TOO BUSY TO LIVE ?

Are you really too busy to have a health checkup once a year? Or do you put it off because you're afraid your doctor might find something wrong?

If it's cancer you're worried about, remember that doctors are curing many more cancers than they could ten years ago. 800,000 Americans are alive today, cured of cancer... many of them because they had made a habit of having annual checkups no matter how **well** they felt... **all** of them because they went to their doctors **in time!** Make annual checkups a habit ... **for life!**

AMERICAN CANCER SOCIETY

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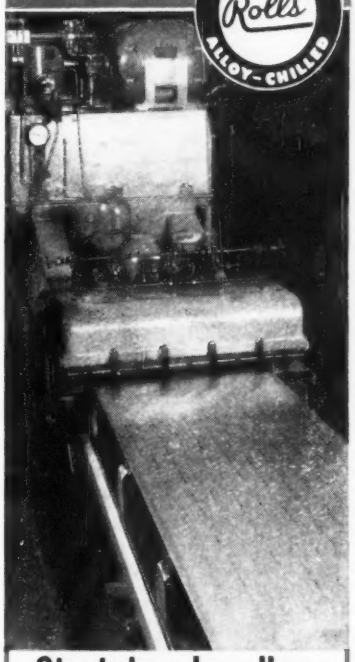
Rolling Mill Equipment

RED CIRCLE Rolls ALLOY-CHILLED



Stretcher Levellers

Complete range of stretching capacities from 150 to 750 tons, for levelling ferrous and non-ferrous sheets in sizes up to 120" wide x 500" long.

Speeds and length of "stretch" to meet all requirements.

Adaptable for automatic cycling.

Bar Mills • Merchant Mills • Sheet and Strip Mills • Pinion Stands
Roller Tables • Reduction Drives
Stretcher Levellers • Roll Lathes • Guillotine Shears
Special Machinery • Sheet Mill Shears • Machine Work

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GRAY IRON CASTINGS

Reinforcing Rod Plant UPS PRODUCTION 300%

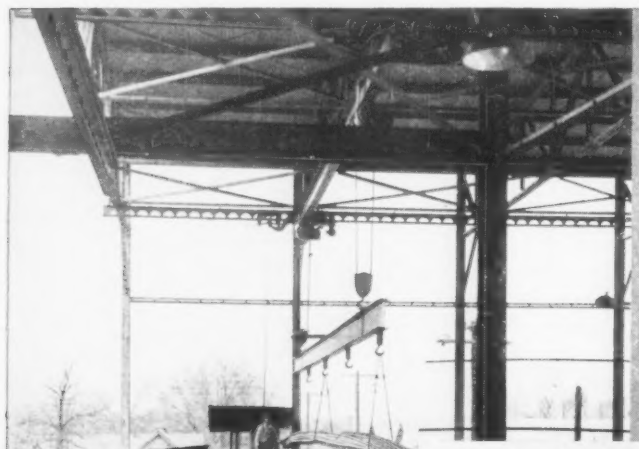
Cleveland Tramrail System Pays For Itself In 6 Months

AFTER a reinforcing rod plant built a new building and equipped it with Cleveland Tramrail cranes, manufacturing costs took such a nose dive that they would make any cost-conscious plant manager blink with amazement.

Whereas eight men were required to work 8 hours to unload a 50-ton car of rods in the old building, two men using Tramrail cranes now do the job in 30 minutes. The Tramrail equipment has enabled doubling the production, and at the same time reducing man-hours by one-half. In other words, the production per man-hour is four times what it formerly was.

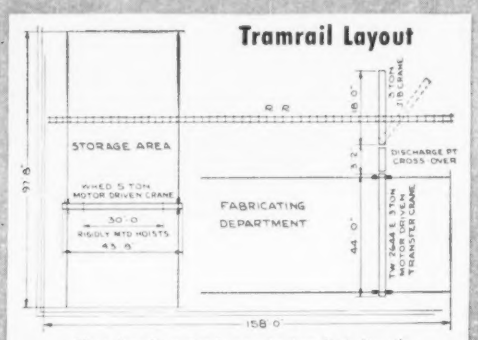
The savings have been so phenomenal that the entire Tramrail system was paid for in the first six months of operation.

Nearly every industry is securing important advantages with Cleveland Tramrail equipment. A nearby Tramrail sales engineer will gladly suggest ways that savings can be made in your plant.



5-ton crane handles 60'-0" long bundles of rod from railroad car to storage and to shear.

Outgoing truck is quickly loaded with 3-ton crane.



Note that 3-ton loads can be handled directly between jib crane and 3-ton transfer crane.

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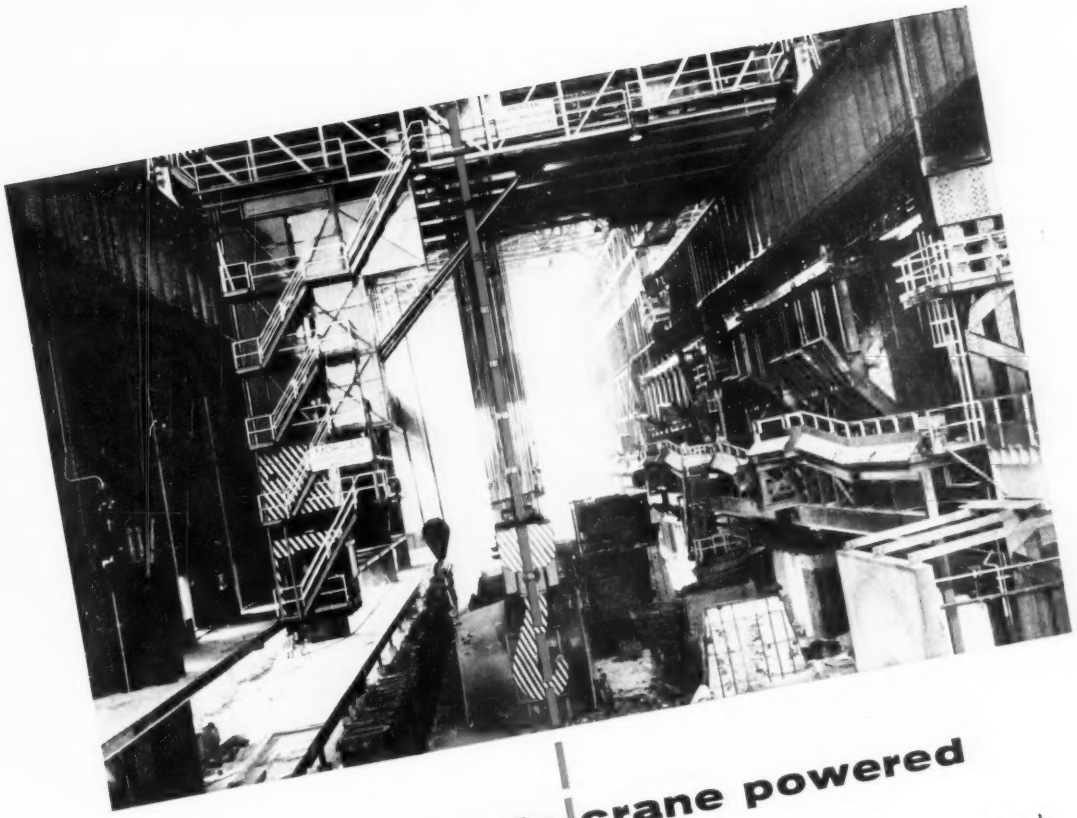
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7803 East 290th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



Morgan 500-ton ladle crane powered by Cleveland drives

In an Eastern steel producer's open-hearth department, this giant 500-ton hot metal ladle crane substantially speeds up furnace-to-mold time on their ingot casting flow.

It features two custom-built Cleveland worm and gear sets transmitting 360 horsepower each for driving the hoist gear train on the 500-ton large trolley—providing uniform hoisting speed and power at all times.

Clevelands are designed and built to meet any requirement, wherever a powerful right-angle drive is preferred. Get the latest facts on the "Cleveland Story". Write us for your free copy of Bulletin 145. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

FROM START TO FINISH IN HANDLING STEEL

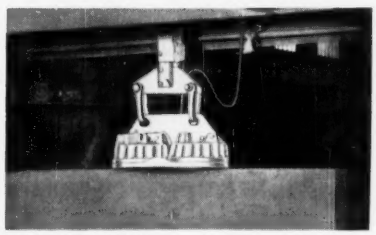
From scrap yard to finished product, the modern efficient way to handle metals is with a Cutler-Hammer Supermagnet . . . the first name in lifting magnets for more than fifty years!

SPECIAL PURPOSE MAGNETS

Designed for specific applications, Cutler-Hammer Magnets can substantially reduce handling costs. As shown in the main illustration, Cutler-Hammer Rail Handling Magnets move multiple rails swiftly, efficiently, and safely.

BI-POLAR MAGNETS

These Cutler-Hammer Magnets are designed specifically for handling structural shapes such as I beams, angles, and channels. Cutler-Hammer Bi-Polar Magnets have played a major role in cutting the cost of classifying and stacking beams for shipment.

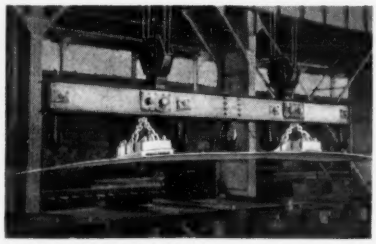


DUPLEX MAGNETS

This custom-built duplex magnet for slab turning in a scarfing department is a good demonstration of Cutler-Hammer's ability to design and build magnets for even the most varied and specialized applications.

CIRCULAR MAGNETS

Cutler-Hammer Supermagnets are known the world-over for their versatility, durability, and dependability. Perfect for handling iron or steel in any form, hot or cold, and in all kinds of weather. Available in either welded or bolted construction, sizes ranging from 39" to 77".



RECTANGULAR MAGNETS

Cutler-Hammer Rectangular Magnets provide maximum lifting capacities with minimum magnet weight . . . also save in crane equipment and daily power consumption. Perfect for regular shapes such as sheet and bar stock, etc. Heavy duty rectangular magnets recommended for handling billets, ingots and slabs.

CUTLER-HAMMER
CONTROL
C-H

To solve your metal handling problem, look to Cutler-Hammer where you are assured not only the finest magnet on the market today, but the magnet that's perfect for your needs. Write today, Dept. Z-213. Cutler-Hammer Inc., Milwaukee 1, Wis.

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